The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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THE CHEMICAL AGE INDEX.

With this issue is published an Index to Volume XXI of THE CHEMICAL AGE, *covering the period July to December, 1929.*

Mischievous Chemical Reports

LAST week we drew attention to some comments in the evening press on Dr. Millikan's recent address to the American Association for the Advancement of Science which indicated a pathetic lack of understanding both of the man and of his philosophy. This week a letter is published from Imperial Chemical Industries correcting an absurdly ill-informed report that appeared in the *Morning Post*, a journal whose views used to be treated as almost as authentic as those of the Established Church. As we announced recently in our reviews of the nitrogen industry in general and particularly of the remarkable growth of the operations at Billingham, the great construction programme instituted a few years ago has been completed, and the workmen who have been engaged in building the plant, having finished their job, take up their tools and walk. That is what usually happens when the decorators pay their triennial visit to the domestic homestead—when the work is done the painters and the plumbers, like the captains and the kings, depart. This explanation, however, was much too simple for the *Morning Post's* own correspondent. He discovers that the synthetic ammonia plant, which the company has just spent very large sums in enlarging, is being restricted and workers will lose their jobs "partly owing to the state of the world markets of sulphate of ammonia." This being not sufficiently convincing, the sub-editor adorns the news with the heading "Chemical Trade Depressed!"

The secretary of Imperial Chemical Industries has promptly disposed of the report so far as that company is concerned. His letter may make people pause before accepting too readily the rumours that have recently been circulated respecting shares in well-known chemical organisations. A glance at the most recent Board of Trade returns will as promptly dispose of the rest of it, heading included. For the November figures, in relation to chemical exports, are the best of the whole year, and the exports of ammonium sulphate amount to £660,176, as compared with £316,814 for November of 1928. It is really a curious mentality that discovers signs of depression in such satisfactory and striking expansion.

The Duckham Report on Transport

THE attitude of the private wagon owners towards the Report of the Standing Committee on Mineral Transport—shortly known as the Duckham Report—is not favourable. The relations between the chemical and the fuel industries are steadily becoming closer, and to chemical manufacturing firms, as well as to gas companies, the handling of our coal supplies, no less than their scientific study and utilisation, is a matter of increasing importance. Anyone who has witnessed the conveyance of coal and coke in the United States—the size of the wagons and the ease with which they are emptied—must have been led to contrast the system with the medley of types and sizes of wagons in use in this country. Yet the recommendations of the Duckham Report in favour of larger standardised types are to receive no support from the private wagon owners because of their belief that the adoption of the proposals will be very much against their interests. We are not sure that the report was drawn up primarily in the interests of the wagon owners; more probably its object was to improve transport conditions generally in the interests of all who use fuel. But what is intended for the good of national industry as a whole cannot very well be bad ultimately for the interests primarily concerned, and in any case the present conditions cannot be regarded as helping much-needed progress in the coal industry.

The position taken up by the private wagon owners is that the estimated cost of altering collieries and works to enable them to take 20-ton wagons is far too low. They cannot reconcile the basis of the figures with any calculations known to them, and they feel that the indirect and consequential expenses incurred by any such compulsory alteration would be very serious

As to pooling, they consider that they would be definitely worse off under any such scheme both as regards wagon supply and costs; and the proposals would require the setting up of new and needlessly costly organisations for the proper tracing, allocation and costing of wagon movements without enabling any compensating reductions to be made in the clerical and administrative staff costs at the works and collieries. No pooling plan would do away with the need to sort wagons so that each works received the type it wanted. Standardisation, even were it possible, would be a very lengthy process, and without it most of the benefits claimed by advocates of pooling would not in fact be realised.

Such difficulties as these are not, of course, to be disregarded, but they are inevitable in any plan for changing the present arrangements into something more systematic. Standardisation, which is now a widely accepted principle, is no more impossible in the matter of coal wagons than in anything else, once the interests concerned decide upon it; but the fact that it would be "a very lengthy process" seems an argument rather for making a start than for delaying it. It is, in any case, a confession of the unstandardised condition of coal transport organisation at present.

Benzole Standard Specifications

THE National Benzole Association is to be congratulated on the valuable work it has just completed in the preparation of standard specifications for benzole and allied products. The Association had previously published a standard specification for motor benzole, and had recognised the advantage of extending standardisation to the other constituents of the light oil fraction of coal tar. With this purpose in view, the Association secured the collaboration of a joint committee representing the manufacture, the application, and the testing of these products. The Association itself was represented by Mr. W. Gordon Adam (Gas Light and Coke Co.), who acted as chairman; Mr. G. A. Hebden (South Yorkshire Chemical Works), vice-chairman; and Mr. W. H. Coleman (National Benzole Co.). The Association of Tar Distillers was represented by Mr. H. C. Hitchcock (Burt, Boulton and Haywood, Ltd.); Mr. H. W. James (South Metropolitan Gas Co.); and Mr. E. Lloyd (Simon-Carves, Ltd.). Three members were co-opted—namely, Dr. T. Callan (Imperial Chemical Industries); Dr. H. G. Colman (consulting chemist); and Mr. H. E. Nichols (analytical chemist)—and Mr. P. G. Somerville acted as secretary.

The specifications now appear in a very useful volume (pp. 145, 6s.), which is published by the Association in the hope that they will achieve for the other light oil products what has already been accomplished in the case of motor benzole. The work begins with three standard definitions—light oil (the terms "light oil" and "crude naphtha" being treated as synonymous), crude benzole, and benzole fore-runnings. Light oil is defined as "a distillate from high-temperature coal-tar, containing commercial quantities of aromatic hydrocarbons distilling below 190° C." Crude benzole is "a product recovered from coal-gas and consisting essentially of aromatic hydrocarbons." The definition of benzole fore-runnings is "the first fraction distilled from benzole, crude benzole, or light oil; containing a high proportion of low-boiling constituents, including carbon disulphide and, in the case of unwashed products, unsaturated hydrocarbons."

The standard specifications (which are intended for application only when the standard testing methods of the Standardisation of Tar Products Tests Committee are used) number fourteen, and include pure benzole, pure benzole for nitration, motor benzole, 90's benzole, 90's benzole for colour manufacturers, pure toluole, pure toluole for nitration, 90's toluole, pure xyzole, 3° xyzole, 5° xyzole, coal tar solvent naphtha, heavy coal tar naphtha, and heavy coal tar naphtha (unrectified). Clear and concise methods of testing are described for sixteen selected characteristics, such as colour, specific gravity, sulphur, neutrality, crystallising and flash points, etc. Methods of reading thermometers are prescribed, together with standard testing apparatus, such as thermometer, distillation flash, draught screen, receiver, tar acids flask, and sulphonation apparatus.

The preparation of all this matter has obviously involved much work of a patient and exacting character. There is nothing spectacular about it, but it was obviously well worth doing from the point of view of establishing recognised standards of quality in an industry where the absence of standards would leave confusingly wide margins of variation in quality. The Association deserves recognition for its policy of introducing definite standards which give consumers a guarantee of the products they purchase or use, and the members of the joint committee are to be congratulated on the thoroughness with which the exacting duties they undertook have been discharged.

The Calendar

Jan.		
14	Institute of Metals (N.E. Coast Section): "Chromium Plating." L. Wright. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
14–15	Society of Glass Technology.	University, Sheffield
15	Institute of Chemistry (London Section): Visit to Laboratories and Bakeries of J. Lyons and Co.	London.
15	Society of Dyers and Colourists (Midlands Section): "Measurement of Fading." Dr. S. G. Barker.	University College, Nottingham.
15	Society of Chemical Industry (Newcastle Section): "Methods of Filtration in Industry." R. D. Burn. 7.30 p.m.	Armstrong College, Newcastle.
16	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
16	Institute of Chemistry and Society of Chemical Industry. Open Meeting for Short Papers on Recent Advances, New Apparatus, etc. 7.30 p.m.	36, York Place, Edinburgh.
16	Society of Chemical Industry (Glasgow Section). Joint meeting with Institution of the Rubber Industry; "Electro-deposition of Rubber." W. A. Williams.	Glasgow.
17	Society of Dyers and Colourists (London Section): "Lake Colours—Manufacturer and Users." H. Clayton.	London.
17	Society of Dyers and Colourists (Manchester Section): "Faults in Textiles." W. Kershaw. 7 p.m.	36, George Street, Manchester.
17	Society of Chemical Industry (Liverpool Section): "The Activated Sludge Process for Sewage Disposal." Prof. E. C. C. Baly. 6 p.m.	University, Liverpool.

The World's Sugar Industry

Mr. Lewis Eynon's Streatfeild Memorial Lecture

The Twelfth Streatfeild Memorial Lecture of the Institute of Chemistry was delivered recently by Mr. Lewis Eynon, B.Sc., F.I.C., who took as his subject "The World's Sugar Industry." The lecture has now been published in pamphlet form by the Institute of Chemistry, and the more important sections are reproduced below.

MR. EYNON dealt first with the early history of the sugar cane and cane sugar. As regards Europe, the sugar cane was introduced into Spain in the eighth century by the Moors, and the manufacture of sugar, both in Spain and in other countries bordering on the Mediterranean Sea, became, and continued for some centuries to be, a flourishing industry. At present Spain is the only European country growing cane,and the amount grown there is comparatively small. The Crusaders, returning from the Holy Land, brought with them a taste for sugar acquired in the East, and a demand for sugar soon arose in Northern Europe, this demand being met by the Mediterranean countries. Sugar appears to have first been imported into England early in the fourteenth century.

The Early Industry in Europe

The Mediterranean sugar industry suffered greatly and became almost extinct owing to the extension of Turkish domination at the beginning of the sixteenth century ; but at about the same time the cultivation of the cane was introduced into the islands off the West Coast of Africa by the Portuguese and so successfully as to cause a considerable reduction in the price of sugar. It is said that the art of refining sugar was introduced into England in the reign of Henry VIII ; for some time before then most of our sugar had been imported from Antwerp. In 1544 there were two sugar refineries in London, and the number had increased to seven or eight by 1615.

The discovery and exploitation of the West Indian Islands and the American Continent led to another shift in the centre of gravity of the cane sugar industry ; the cultivation of the cane was introduced to the New World by the Spanish conquerors, and, aided by fertile soil, favourable climatic conditions, and an abundance of slave labour, America and the West Indies supplied the bulk of the world's sugar during the seventeenth and eighteenth centuries. In the seventeenth century the Dutch East India Company introduced the sugar cane into Java.

Beginning of Sugar Beet Cultivation

The industry suffered severely during the Napoleonic Wars, the export of sugar to Europe being greatly hindered by both the British and French fleets. The blockade of French ports by Great Britain caused an enormous increase in the price of sugar in France, and led to attempts to obtain sugar from other sources—namely, grapes and beetroot.

The endeavours to obtain sugar (*i.e.*, glucose) from grapes on a commercial scale were not very successful, but the endeavours to obtain sugar from the beetroot met with a very different fate. In 1747 the German chemist, Marggraf, had observed that the beetroot contained a considerable amount of sugar, which he succeeded in extracting in the crystallised state. This discovery remained unheeded for many years until Achard, at the end of the eighteenth century, made experiments on the cultivation of beetroot in the hope of increasing the sugar-content, and built the first sugar factory in Silesia. Owing, however, to the comparatively low sugar-content of the roots and to inefficiency of juice extraction and clarification, Achard's venture was not very successful, and it was not until the cane sugar famine, caused by the blockade, that the beet sugar industry was revived in Germany and begun in France.

The new industry was enthusiastically supported by Napoleon, who founded schools of instruction for sugar manufacture, and the enormous price of sugar at that time led to the building of numerous factories in France, Germany and Austria. Most of these factories disappeared when the blockade was raised at the end of the war, and in Germany the industry became almost extinct for twenty years.

Progress in France

In France, however, owing to continued strong support from the Government, the beet sugar industry developed rapidly, and, by 1836, about one-third of the sugar refined in France was beet. At about this time, too, the industry was revived in Germany and Austria, and by 1860 it was general in Europe. In the early days of the beet sugar industry the sugar was extracted by rasping the roots to pulp and pressing the pulp to expel the juice, the pressed pulp being treated with hot water and pressed again. This method was not very efficient in extracting the sugar, and the disintegration of the plant cells caused by pulping allowed the passage of a large proportion of non-sugar substances into the press juice ; from about 1865 onwards this process was gradually replaced by what is known as the diffusion process in which the roots are cut into slices or cossettes, and these are subjected to a systematic extraction with hot juice of progressively decreasing concentration in a series of vessels known as a diffusion battery.

Despite the development of the European beet sugar industry, the importation of cane sugar into Europe continued to increase until after the middle of the nineteenth century owing to the rapid increase in consumption. During the latter half of the century, however, the European production of beet sugar increased at such a rate as to affect the cane sugar industry very seriously. This state of affairs was due to three main causes : The abolition of slavery deprived the cane industry of its supply of abundant cheap labour ; the institution of the bounty system in European sugar-producing countries, whereby manufacturers were enabled to export sugar even below its cost price, was very prejudicial to the cane sugar industry, which had no such artificial support ; the third factor which helped to depress the cane sugar industry was its lack of scientific enterprise and control.

The European bounty system, which had done so much to promote the growth of the beet sugar industry, was attended by serious economic disadvantages to the countries which had adopted it, and, in 1902, the system was abolished by the international agreement known as the Brussels Convention. This step improved the condition of the cane industry very materially, enabling it to recover much of the ground that it had lost. In addition to this, a new spirit of enterprise and scientific investigation arose in the cane industry about 40 years ago.

The Recovery of the Cane Sugar Industry

The recovery of the cane sugar industry, as a result of the abolition of the beet sugar bounties and of the introduction of more scientific methods, is illustrated by the following figures : In the year 1901–2, of a total world production of nearly fourteen million tons of sugar, the cane and the beet each contributed about 50 per cent. In the year 1913–14—that is, the year immediately preceding the European War—of a total world production of about 18½ million tons, cane contributed 52½ and beet 47½ per cent.

The European War of course had the effect of altering the position still more strongly in favour of cane sugar. Most of the beet sugar producing countries of Europe were engaged in the struggle, and the export of sugar from these countries was completely arrested. Most of the cane sugar producing countries, on the other hand, were neutral, and even those that took part in the War were so far from the main theatres of action that their industrial life was little disturbed ; moreover, the sea routes to their best customer—Great Britain—were open. Hence it is not surprising that although the total world's sugar supply had fallen to about 16¾ million tons in 1917–18, or nearly two million tons less than in 1913–14, the cane sugar supply increased absolutely as well as relatively, amounting to 12¼ million tons, or 73 per cent. of the total, whilst the beet sugar supply was little more than half of what it had been in 1913–14.

The Post-War Position

After the War, the beet sugar supply increased rapidly; from year to year, and is now about as large—eight or nine million tons per year—as it was in the period immediately preceding the War. The cane planters and cane sugar manufacturers, having so largely increased their output during the War, were not inclined to return to pre-war conditions, and the result has been that during the last decade the world's

total sugar supply has increased very rapidly, amounting in 1927–28 to rather more than 25 million tons, of which about two-thirds is cane and one-third beet sugar. This total is nearly double the annual supply of 25 years ago.

Of the factors concerned in the increase, the selection of plants of increasing sugar-content has probably been the most important. The beetroots from which Marggraf obtained crystallised sugar in 1747 may have contained 4 or 5 per cent.; in 1838, forty years after the beginning of the beet sugar industry, the sugar-content of the roots had risen to about 9 per cent.; in 1898 it was 15 or 16 per cent., and it is now about 18 per cent.

The British Beet Sugar Industry

The first attempt to establish a beet sugar industry in this country was made about seventy years ago by James Duncan, who built a factory at Lavenham in Suffolk. The stress of foreign competition and the difficulty in obtaining roots in sufficient quantity prevented the success of the enterprise and after a few years the factory was closed. In 1910 another start was made, a factory being erected at Cantley. Shortly after the war, the industry received some Government help in the form of preferential treatment, but it was not until the passage of the British Sugar Subsidy Act in March, 1925, that a great development of the industry occurred.

With a heavy subsidy, and aided also by a preferential treatment over foreign sugar, the acreage under beetroot cultivation rapidly increased and well-equipped factories were erected; the number of these in England and Scotland is now eighteen. By 1927 the area under beet had increased to about 236,000 acres, and the amount of sugar produced in the 1927-28 campaign was about 200,000 tons. In 1928 the acreage fell to about 180,000, but rose in 1929 to 232,000 acres —a record for the home industry.

The real trial as to whether the home industry can stand the stress of world competition will come with the disappearance of the subsidy in 1933-34. The quantity of sugar produced by the home industry is of the order of 10 to 12 per cent. of home consumption and less than 1 per cent. of the total world supply. An enormous saving in the cost of beet sugar would result if it were possible to run the raw sugar factory all the year round. As it is, the beet sugar factory works at high pressure for the campaign of three or four months and is idle for the rest of the year. Some of our British factories meet this difficulty by refining raw sugar during the "off" season.

From time to time processes have been devised for drying beet slices so that they will keep indefinitely and thus allow the factory to run continuously. The question as to whether the cost of drying the slices is more than counterbalanced by the saving effected in running the factory for the whole 12 months does not appear to have been settled yet.

Difficulties Facing the Sugar Industry

The problem that has to be faced by the cane and beet industries is the regulation of their supply to meet the demand for it. Mr. Eynon touched on the attempt made by the Cuban Government in 1926 to improve the situation by a restriction of output. This policy of restriction, however, sadly disappointed its promoters. The Cuban Government has since abandoned the policy of restricting output, for the present at least. During the year 1929 the problem of dealing with the world's surplus sugar engaged the attention of the Economic Committee of the League of Nations, and, amongst the measures proposed to solve it, restriction of output by international agreement and encouragement of consumption may be mentioned.

The Consumption of Sugar

It was pointed out recently that the sugar cane and sugar beet are more efficient as food producers than cereals or potatoes, and it was suggested that, in view of the world's increasing population, an increase in sugar production should be encouraged. This would only be justified, however, by increased consumption per head, since the world's population does not grow at a rate commensurate with the potential increase in the world's sugar supply. It seems inevitable that the rapid increase in the world's sugar supply must slacken in the near future, unless some other use for sugar than as a food is found. This brings us to the subject of power alcohol from sugar as a substitute for petrol.

Power Alcohol From Sugar

The only reason why cane sugar or juice has not been utilised for the production of industrial alcohol to any considerable extent hitherto, is the fact that it commands a higher price as a food. Molasses is, of course, used as a source of industrial alcohol, but it is only a by-product of the sugar industry, and forms but a small proportion of the sugar factory output. It does seem probable, therefore, that with an increasing world supply of sugar, the excess, beyond what is required for human consumption, will in time find an ample demand in the production of power alcohol; and it seems probable, too, that power alcohol from sugar may be used side by side with petrol long before the world's store of the latter is exhausted. The competition between alcohol and petrol will be governed by comparative efficiencies and prices; alcohol has a lower calorific value than petrol, but this is approximately compensated by its higher ratio of work done to heat expended.

If we take the rather moderate estimate of four tons of sugar as the yield per acre under sugar cane—then, reckoning that this quantity of sugar yields 520 gallons of alcohol, one acre would suffice to support two small cars each travelling about 7,000 or 8,000 miles per year. And when we consider too, that one light car, used to this extent, would consume about 2 tons of sugar per year, *i.e.*, as much sugar as is eaten by fifty people in this country, and that mechanical transport on land, on the sea and in the air, will make an ever-increasing demand for fuel, I do not think we need fear (said Mr. Eynon) for the future of the world's sugar industry.

I.C.I. and Australian Lignite

THE Victorian Mines Department has despatched to Imperial Chemical Industries, in England, 230 tons of brown coal from the Gelliondale field, near Yarran, in Gippsland. The sample, which was mined at a depth of 60 ft., the coal being taken from drives in several directions at the bottom of the shaft, is to be thoroughly tested. A smaller sample some time ago encouraged the company to try this much larger test. Early this year it is expected that the result will be known. Until March next the Government has undertaken not to lease any portion of the field so that the company may thoroughly test the coal. The Victorian Secretary of Mines (Mr. Merrin) states that there were 200,000,000 tons of coal in the Gelliondale field, with a possibility of 1,250,000,000 tons. In the State there have been proved to be 12,000,000,000 tons of brown coal, with a possibility of 35,000,000,000 tons.

Programme of Research on Tin

A COMPREHENSIVE plan of research work for 1930 was announced recently by Colonel S. Heckstall-Smith, honorary secretary of the Tin Industrial Applications Committee, which is working in co-operation with the British Non-Ferrous Metals Research Association to investigate the industrial applications of tin and to discover new and improved uses for the metal. The most important lines of research will be:—(1) To investigate the non-corrodible properties of tin in relation to other metals with a view to establishing scientific data as to its industrial value: (2) To investigate improved methods of alloying tin to steel plates with a view to broadening the market for canning of foods; (3) To investigate the value of tin in relation to the lubrication of high speed machinery; (4) To establish the non-toxic qualities of tin as the safest metal to be in contact with milk and other foods.

Italian Production of Synthetic Methanol

IT is believed that the Casale process for the production of synthetic methanol has been perfected by the engineers of the company and that it is now being applied industrially at the plant of the "Siri" (Società Ricerche Industriali) at Terni. The Ammonia Casale and the Società Terni are jointly interested in this plant to the extent of 60 per cent. and 40 per cent. respectively. The "Siri" plant is now producing a ton and a half of synthetic methanol daily, which is as much as can be absorbed by the Italian market at present. The plant has a capacity of six tons daily.

Lord Brotherton on Chemical Industry in 1929

Views of a Great Manufacturer

The following summary of the development of the British chemical industry in 1929 is reprinted from the "Yorkshire Post" annual trade review, to which it was contributed by Lord Brotherton. The article has the special interest that it comes from a great chemical manufacturer.

In the chemical industry, the year was one of moderate trade and steady development. But the promise of the earlier part was not fulfilled in the later stages; optimism was replaced by hesitancy and confidence by a feeling of instability. The outlook for 1930, while not black, is not reassuring. The country is in need of lower taxation, lower prices and the safeguarding of important industries. From this would follow more work for British workmen and lower prices. In the place of these favourable factors, however, we are warned to anticipate higher taxation and a relaxation of the principle of Safeguarding. Under such conditions, an increase of trade and of the number of men absorbed into industry cannot be expected.

Fertilisers

Substantial progress has been made in the fertiliser industry. The Imperial Chemical Industries' plant at Billingham has been increased to a capacity of 2,000 tons of sulphate of ammonia per diem; and the same factory produces increasing quantities of nitro chalk, a fertiliser containing half its nitrogen as ammonia and half as nitrate, and also neutral ammonium phosphate. Special propaganda measures, embracing all potential users throughout the world, have been inaugurated in order that outlets may be found for these large new productions; and the results to date are encouraging. A new research organisation consisting of modern laboratories and farms of arable and pasture land has been set up, so that agricultural problems of all kinds may be studied. At the head of this organisation is Sir Frederick Keeble, formerly Fellow of Magdalen College, Oxford.

The incursion of cheap synthetic fertilisers has had a profound effect upon the market for Chilian nitrate; for a time it seemed that nitrate might be superseded. A period of price-cutting was, however, followed by an agreement between the British and German makers of synthetic ammonia, and the Chilian nitrate producers. This agreement aimed at stabilising the price at a level sufficiently low to encourage consumption, and yet high enough to yield a reasonable return upon the capital involved; and matters appeared to be settled upon this basis. More recently, however, a new factor has appeared—a large synthetic output from Belgium; and, the Belgians being outside the fertiliser agreement, a new period of price-cutting has begun. In consequence, the export price of sulphate of ammonia is at present about one-half its pre-war price.

The effect of this upon the British gas industry is very serious. Most gas works convert their ammoniacal liquor into sulphate of ammonia, or sell the liquor for conversion by chemical manufacturers into ammonia products. Up to recent times, sulphate could be made at a profit, and the price of gas was lower in consequence; but at to-day's price of sulphate, losses are being made; and these losses will have their reflection upon the price of gas. Many gas concerns are having to pay for the removal of their liquor, which, instead of being an asset, as hitherto, has become a liability.

Heavy Chemicals

Notwithstanding the continued depression in general industry, trade in heavy chemicals has shown a steady improvement; the value of chemicals exported is higher than in 1928, though prices of products are in most cases lower. Production of sulphuric acid, which is regarded as an index of the state of trade, has increased. In terms of 100 per cent. sulphuric acid, the amount produced in Great Britain and Ireland in the year ended September 30, 1929, was 966,700 tons—an increase of about 60,000 tons over the preceding year. A larger proportion is now being made from pyrites, while the proportion made from brimstone has decreased.

Better trade in heavy sodium compounds, soda ash and crystals, sodium bicarbonate and sodium sulphate, has been enjoyed by manufacturers of those products. In this connection, it is interesting to note that preparations are being made at Billingham to instal plant for the manufacture of a range of sodium compounds, including metallic sodium and sodium cyanide.

With the exception of the tar acids, which are in active demand for the production of synthetic resins, coal tar products have not been in great demand. The market for pitch appears to have fallen away; and, largely owing to a considerable increase in American production, creosote is almost unsaleable at normal prices, large quantities having been disposed of at prices which are hardly more than the cost of carriage to port. The refined tar market was rather better than in the preceding year, though prices were lower. Refined tar is now sold as a standardised product. It could be used in greater quantities upon our roads. Its properties render it as least as valuable a material for road-making as bitumen—an imported product. Yet, largely owing to an active sales policy of the bitumen companies, the British product has been partly displaced by the foreign. It is to be hoped that the efforts now being made by the Road Tar Association to induce surveyors to use more road tar in the coming year will be crowned with success. There is a strong claim for the displacement of bitumen. Road tar is cheaper; it is claimed to be at least as good; it makes a non-skid road, and it is British.

Tar Distillation

Rationalisation has been at work in the tar distilling industry, a strong group of distillers in Lancashire combining to form Lancashire Tar Distillers, Ltd., and a number of distillers in Scotland joining forces under the name of Scottish Tar Distillers, Ltd.

Low-temperature distillation products have not yet appeared in any quantity upon the market, and, when they do, it is probable that a new technique will have to be evolved for the treatment of the tar. It is reported that the low-temperature tar produced on the Continent is hydrogenated into lighter products—benzol and similar fuels—in the German synthetic products works.

Dyestuffs

As little more than a year of the period covered by the Dyestuffs Act now remains, the attitude of the Government towards protection of this vital industry must be declared before the next trade review appears. The industry continues to make progress, but some form of Safeguarding would appear still to be advisable. The following Board of Trade figures show that substantial increase in production has occurred:—

1926	30,297,000 lbs.
1927	39,551,756 lbs.
1928	50,907,080 lbs.

The figures for 1929 are not yet available, but there is reason to believe that a further increase will be shown.

The British export figures also are eloquent of better trade. The figures are abstracted from the latest report of the U.S.A. Department of Commerce; and are thus in dollars:—

1926	2,400,000 dollars
1927	3,000,000 dollars
1928	3,900,000 dollars

It is to be noted that the weight increase is considerably greater than the value increase, as the prices of colours were much lower in 1928 than in 1926. Again, it is confidently expected that 1929 will show enhanced figures. On the technical side much progress has been made; and it is interesting to note in this connection that the number of patents for new processes taken out in 1929 was greater than that of any other year.

Fine Chemicals

Substantial progress has occurred in the fine chemical industry, but development has been somewhat retarded by the manner of application of that clause of the Safeguarding Act which purports to explain how the duty shall be assessed upon imported products. The clause is as follows:—The value of any imported goods for the purpose of this Act shall be taken to be the price which an importer would give for the

goods if the goods were delivered to him freight and insurance paid, in bond at the port of importation, and duty shall be paid on that value as fixed by the Commissioners.

Manufacturers of fine chemicals hold the view, which seems a reasonable one, that the price which an importer would pay should be a real price, and not an arbitrary one fixed by the importer at a sufficiently low level to enable him to import goods to compete against the British article. In practice, however, the price upon which duty is assessed is an arbitrary one. It is lower than the price in the country of origin, it is lower than the world price ; it is lower than the British price. The consequence is that the goods continue to be imported and used in this country, while workmen who could be employed in their manufacture are drawing unemployment insurance pay. An alteration in the method of assessing the duty would seem to be overdue.

Papers on Cellulose and Metafiltration

First 1930 Meeting of London Section of S.C.I.

A meeting of the London Section of the Society of Chemical Industry was held in the rooms of the Chemical Society, Burlington House, London, on Monday, when papers were read by Dr. C. J. J. Fox and Mr. J. A. Pickard.

THE Chairman (Dr. G. T. Morgan, F.R.S.) announced that Dr. Colegate, hon. secretary to the London Section, having been elected hon. treasurer of the Society, had felt compelled to resign his position in the London Section. Dr. H. E. Cox had been elected to succeed Dr. Colegate as hon. secretary of the section.

The Micelle Chemistry of Cellulose

Dr. C. J. J. Fox, in the course of a paper on the above subject, said that during the last few years there had been great advances in our knowledge of colloids, and X-ray analysis had given us an insight, never previously available, into the structural characteristics of the solid state. The conception of micelle had proved of great value in interpreting some of the phenomena of colloid dispersions, and the cell unit of the space lattice had been a very serviceable guide in interpreting the evidence of X-ray analysis. Those who were in daily contact with the chemistry of such a substance as cellulose had accordingly had to adjust their ideas and their interpretations to bring them into line with these new advances of knowledge.

By the results obtained by X-ray methods during the past decade, much important information had been added to what was previously known of the constitution of cellulose.

Crystalline Structure

It had been found that cellulose, of whatever origin, showed a crystalline structure to X-radiation. The unit cell apparently contained four glucose residues, each glucose residue being so arranged that five of its six carbon atoms formed a ring with one oxygen atom. The conclusion that there were four glucose residues in the cellulose cell, however, was new and hitherto undecidable. There was also some evidence, which had, however, been disputed, that the four glucose residues were further arranged as two cellobiose residues, each joined by an O-bridge from unit cell to unit cell of adjoining neighbours.

All experience supported the belief that only nature knew how to build up micelles such as characterised the noblest celluloses, *e.g.* cotton, and that whatever man did diminished the micelle size. Therefore, industrially it was of the utmost importance to avoid unduly diminishing the micelle size of the raw material.

Metafiltration

In a paper on "Metafiltration," Mr. J. A. Pickard said that one of the greatest troubles in filtration had been the cleaning of the filtering medium, owing to the tendency for the substance which was being filtered out to enter the interstices of the filtering medium and clog them in such a way that they could not be cleaned easily. This was particularly the case with filters employing filtering cloth, which was used in a very large proportion of filters. Therefore, an endeavour had been made to obtain a better type of filtration medium. It had occurred to him that the edge type of filter could be dealt with advantageously from this point of view if some of the disadvantages of that type of filter could be avoided. With this object in mind, a filter of the edge type had been designed, but built up in quite a different manner from the usual edge type of filter, and it had been put into practice with a considerable amount of success.

The filter was composed of strips of non-porous solid material, such as brass, copper, bronze, stainless steel, celluloid or vulcanite, and one or two other materials which were capable of mechanical cold working. The strips were flat on the bottom and flat in the centre on the top side, but bevelled off towards the edges on the top side. When these were placed one above the other they formed long horizontal "V"-shaped spaces from the outer edges towards the centre, and in conjunction with suitably arranged channels at the top and bottom of the pack of strips and holes in the strips constituted what was termed the "metafilter." The course of the liquid being filtered was from the outside down between the strips into the holes, any particles being stopped in the "V"-shaped grooves which constituted the surface of the filter. Experience had shown that the particles were stopped at some point between the outside edge and the inner edge of the groove, according to their size. At the same time, the liquid continued to flow down through the filter.

The Medium

When he first worked this filter, said Mr. Pickard, it had operated almost entirely in accordance with his expectations, but it had only a limited range in its original form. Consequently, it was decided to make use of a filtering medium in the "V"-shaped grooves, in order to extend the range of operation, and a material, known as "Metasil," which was kieselguhr specially treated, was adopted, with the result that extremely fine degrees of filtration were found to be possible. A feature of the filter was that the deeper the filtration bed the finer was the filtration. The filter in the original form was made with long narrow strips, but there had now been developed a circular form in which the same principles were applied, but which permitted of a more compact form of apparatus being constructed.

Mr. Pickard gave illustrations of a number of industrial applications of this form of filter, particularly in breweries. He indicated that the work of development was at present only in its early stages, and that many other applications were being investigated.

Chemical Trade NOT Depressed

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the paragraph published in the *Morning Post* on the 8th instant, under the heading of "Chemical Trade Depressed," I beg to inform you that this heading is quite unjustified. The chemical trade, so far as we are interested in it, is in a satisfactory state. Our world trade for the year 1929 has been greater than ever before, and everything points to its continued expansion.

The facts as regards the factories at Billingham are as follows :—

On the completion of the constructional programme at these works the occupation which has been found thereon for a large number of men must necessarily cease. This step is inevitable in all constructional work, and is only striking at Billingham because of the magnitude of the new factories.

We have every reason to expect that the production at the Billingham factories during the present year will show an increase over last year, and that the number of men employed on production will be greater than the number so employed in 1929.—Yours, etc.,

IMPERIAL CHEMICAL INDUSTRIES, LTD.
(J. E. JAMES, SECRETARY.)

Millbank, London, S.W.1.

American Chemical Society Elections

Membership Increased by 1,200

As briefly announced in last week's issue, Dr. William McPherson, Dean of the Graduate School of Ohio State University, became president of the American Chemical Society on January 1, as a result of the Society's annual election. Dean McPherson will serve during 1930, succeeding Dr. Irving Langmuir, Associate Director of Research of the General Electric Co. Dr. Moses Gomberg, professor of chemistry in the University of Michigan, was chosen president for 1931. In accordance with a recent change in its constitution, the Society now elects each year a president and a president-elect, who serve in successive years. Professor James F. Norris, of Massachusetts Institute of Technology, and Charles L. Reese, of E. I. du Pont de Nemours and Co., Wilmington, Del., were elected directors for 1930–1932.

Professor McPherson was born in 1864. From Ohio State he received the degree of B.Sc., in 1887, and the master's degree in 1890. He took the Ph.D. at the University of Chicago in 1899. Ohio State conferred upon him the degree of doctor of science in 1895. He has been a member of the Ohio State Chemistry Faculty since 1892, rising to a full professorship in 1897, and to the headship of the Graduate School in 1911. He was acting president of the University in 1924. He was a Lieutenant-Colonel in the Chemical Warfare Service during 1918–19, and was advisor to the Trench Warfare Section of the Ordnance Department. He is a fellow of the American Association for the Advancement of Science, and a member of the Deutsche Chemische Gesellschaft. He is the author of numerous text books on chemistry, and an extensive contributor to scientific publications.

Professor Gomberg was born in Elizabetgrad, Russia, in 1866. He was educated at the Elizabetgrad Gymnasium and the University of Michigan, from which he received the degree of B.S. in 1890, M.S. in 1892, and Sc.D. in 1894. Later he studied in the Universities of Munich and Heidelberg. He has been a member of the teaching staff of the University of Michigan since 1893, and a professor since 1904. He has also been connected with the U.S. Bureau of Mines. In 1914 he was awarded the Nichols Medal of the American Chemical Society, of which he is a member. He is a Fellow of the American Association for the Advancement of Science, and a member of the National Academy of Science. He received the Chandler Medal from Columbia University in 1927. This medal was recently awarded for 1929 to Dr. Langmuir.

The American Chemical Society, Dr. Charles L. Parsons of Washington (the secretary) reports, now has 17,457 members, an increase of 1,200 during the year. The publications of the Society were reported to be in a flourishing condition.

German Benzol Production

Increased Demand Raises Question of Synthesis

ACCORDING to the report of the Benzol-Verbandes G.m.b.H., of Bochum (the German association of benzol manufacturers), the production of benzol in Germany in 1929 has been 20 per cent. greater than in 1928. The demand until into the month of November was so good, that it surpassed the production and made inroads on the reserves. The reason is that there is an increase of benzol-petrol mixtures ("B.V."—Aral) as compared with both unmixed petrol and unmixed benzol. The mixture is more expensive than petrol, but owing to more economical use and lower consumption of oil, is cheaper in practice.

This increased consumption for internal-combustion engines has encouraged research on benzol synthesis in Germany. Dr. Franz Fischer, of the Kohlenforschungs Institut, of Mulheim, is attempting its synthesis from methane. The first step in this development was Berthelot's discovery that methane led through a glowing porcelain tube yielded small quantities of benzol. Upon raising the temperature, however, the methane decomposed. The I.G., in 1925, decreased this methane decomposition by applying pressures of from 300 to 1,000 atm., using temperatures of 500 to 300° C. Fischer avoids pressure, however, uses a 1,000° C. temperature, and accelerates the methane stream. He is said to get from one cubic meter of methane, heated for about one-third of a second, 63 g. of light oil, of which half is benzol.

Chemical Triumphs of 1929

An American Estimate

CHEMISTRY made spectacular advances during the year, according to *Industrial and Engineering Chemistry*, the journal of the American Chemical Society, in prolonging human life, in aiding aviation, in revising old concepts, in building up industry at home and abroad, in developing for American men of science a world-wide system of abstracting chemical literature, in effecting industrial co-operation, and in the advancement of industrial chemistry and chemical engineering.

"It was also the year," it is added, "when physical chemists, breathing hard on the trail of the mathematical physicists leading into the Land of Wave Mechanics, found that the once fundamentally simple gases, oxygen and hydrogen, were, after all, only mixtures of isotopes. It was the year when the Bureau of Standards announced the evolution of a self-extinguishing cigarette and a fireproof match, when the stock market crashed, and even coal was made blue."

Two Great Achievements

The two greatest achievements of 1929 in the chemistry of life processes were the isolation of a toxic sugar produced by the *tubercle bacillus* and the synthesis of the respiration ferment. The deadly polysaccharide was isolated by Messrs. T. B. Johnson and R. J. Anderson of Yale University, from bacilli grown by Parke Davis and Co., and the H. K. Mulford Co. Mr. W. C. White, of the Hygienic Laboratory of the U.S. Public Health Service, tested the sugar and found that it immediately killed tubercular animals and had a noticeable effect upon healthy ones. To Mr. Hans Fischer, of Munich, goes the credit for the synthesis of the respiration ferment, a hæmin. This synthesis is classed as one of the most important contributions ever made to the field of biochemistry.

"The problem," the article continues, "of post-operation respiratory complications and in some instances pneumonia, due to the presence of peroxide or aldehyde in ether used for anæsthesia, has come to the front during the past year. While ether for hospital use is prepared with scrupulous care, and extensive work has been done on anti-oxidants and containers, a considerable quantity has been seized as unfit for use owing to deterioration. Analysis just preceding use rather than on purchase has been suggested as customary hospital procedure. During the year the suitability of ethyocaine borate for local anæsthesia was demonstrated by extensive experiments at the dental school of Northwestern University, ethylene oxide was found to serve as an excellent fumigant against insect pests, and it was discovered that the sodium salt of malic acid may be substituted for sodium chloride in the diet of people suffering from high blood pressure, dropsy, or Bright's disease."

Successes in Related Fields

The Graf Zeppelin, it is pointed out, was not exclusively a chemical triumph, yet it is doubtful if it would have circumnavigated the globe without the help of various obscure persons in laboratories and plants. "These obscure persons," it is stated, "fueled it with ethane derived from natural gas for its first return trip to Germany from America. Later, when the Graf Zeppelin set out from Tokyo for its trans-Pacific flight, its fuel bunkers contained Pyrofax mixed with hydrogen; the last leg of the journey was made with a mixture of Pyrofax and natural gas. Nor was Edison's electric light entirely a chemical dream come true. Nevertheless, a great deal of chemistry seemed to have inextricably merged into its history by the time Henry Ford staged its fiftieth anniversary in Dearborn for his old friend, and brought Einstein into a million American homes through a barrage of intercontinental static in the first international broadcast of its kind. On the other hand, Bonhoeffer, demonstrating the existence of parahydrogen to an amphitheatre of cheering chemists at Minneapolis, seemed to be dealing only obliquely with chemistry as it used to be known, while Giauque and Johnston, determining the existence of an oxygen molecule containing atoms of different atomic weight, would have been crucified as heretics by the chemical fundamentalists of a previous generation.

Death from HCN Gas

Sir Bernard Spilsbury's Evidence

DR. WALDO, the City of London coroner, presided, on Monday, over an inquest on William C. Whitehead, aged 17, a chemical laboratory assistant employed by a firm of metallurgists, who died from hydrocyanic acid gas poisoning. A verdict of death by misadventure was returned.

Whitehead, it was stated, was overcome while cleaning out a tank containing a deposit of cyanide of silver. Although he received prompt attention, and every possible means of saving his life was tried, he died in hospital. The coroner, who declared that he had never heard of a case of poisoning from the fumes of cyanide of silver, said that the tank was cleaned out twice a year. It was necessary to stir up the deposit so that all fumes were dispersed. This was not wholly done, apparently, and Whitehead was overcome.

Sir Bernard Spilsbury said that one of Whitehead's lungs was being retained for analysis to discover how much gas had been absorbed. The cause of death was coma due to poisoning from hydrocyanic acid. The action of hydrocyanic acid gas, Sir Bernard declared, was so rapid—a matter of seconds—that an antidote was rarely effective.

Never Used in War

Asked by the coroner whether he had ever heard of it being used as a gas during the war, Sir Bernard said that he had not known it used as a gas. He had heard of cases of poisoning from the acid, but had not seen one before. He knew of cases having happened in chemical laboratories.

Was it used during the war at all ?—I am not sure that the French did not use it on animals.

Not on Germans ?—I never heard so.

Mr. Arthur William Scott, a metallurgical chémist, explained that the sludge in the tank consisted of nitrate of silver and sodium cyanide, which produced silver cyanide and sodium nitrate. In cleaning out the tank Whitehead would use pure water, which was stirred into the solution, and he had only about another five minutes' stirring to do when he would have finished his job. Mr. Scott was of the opinion that the cyanide gas was lying in a concentrated form in the sludge, and that it escaped when the sludge was stirred. He did not think Whitehead had stirred the solution far enough, and consequently the sludge did not mix with the water as it should have done. The matter was being investigated by the firm's technical committee. Although there were 300 people employed, this was the first accident of the kind that had ever occurred.

Protecting Concrete Against Frost

Use of Calcium Chloride and Sodium Chloride

BUILDING Research Special Report, No. 14, entitled " The Use of Calcium Chloride or Sodium Chloride as a Protection for Mortar or Concrete Against Frost," by Dr. W. N. Thomas, has just been issued by the Department of Scientific and Industrial Research (H.M. Stationery Office, pp. 30, 9d.)

Both calcium chloride and sodium chloride, when added in suitable proportions to the mixing water of a Portland cement mortar or concrete, afford protection against a limited degree of frost during the early setting and hardening periods. Sodium chloride is liable to cause efflorescences on the face of the concrete. Calcium chloride tends to produce discolorations. The commercial forms of both salts are hygroscopic, and unless the concrete is very dense, their presence in reinforced construction is liable to cause corrosion of the reinforcing metal, and particularly to intensify that due to stray electric currents. For reinforced concrete work it would appear inadvisable to use either salt.

Concrete in which sodium chloride is incorporated generally appears to attain a considerably lower strength at long ages than similar concrete without this salt. Calcium chloride has numerous advocates, and many test results show an increase in strength due to its use, even after 1 to 3 years at normal temperatures. The best proportions appear to be 2 to 4 per cent. of the anhydrous salt per weight of cement. On the other hand, certain experiments have shown a decrease in strength, particularly of tensile strength. The employment of calcium chloride thus seems attended with some risk.

British Standard Specifications

Tars for Road Purposes

THE British Engineering Standards Association has now issued a revised British Standard Specification for Tars (Nos. 1 and 2) for Road Purposes, which represents a considerable advance upon the Ministry of Transport (Roads Department) Specifications issued as British Standard Specifications in April, 1928. The Specification now issued has been prepared by the British Road Tar Association, and having been considered and approved, with slight modifications, is now issued by the British Engineering Standards Association as a British Standard Specification, and has the full support of the Ministry of Transport. It covers, as formerly, tar for the surface tarring of roads and for making tarmacadam.

The methods of testing and specifications for apparatus contained in appendices have been specially prepared by the Standardisation of Tar Products Tests Committee. They provide for the determination of every property of the tar covered by the specification, and are prescribed in much greater detail than in the Specification No. 76—Part 1, 1928, now superseded. Copies of the new specification (No. 76—1930) may be obtained from the Publications Department, British Engineering Standards Association, 28, Victoria Street, London, S.W.1, price 2s. 2d., post free.

Physical and Optical Societies

Twentieth Annual Exhibition

THE twentieth annual exhibition of the Physical and Optical Societies was held on Tuesday, Wednesday and Thursday, at the Imperial College of Science, South Kensington,

Over eighty firms accepted the invitation to exhibit in the Trade Section, and in addition a group of research and experimental exhibits was arranged. Addresses, with experiments, were given at 8 p.m. each evening, as follows :—Tuesday.—Lord Rayleigh, " Iridescent Colours in Nature from the Standpoint of Physical Optics." Wednesday.—Mr. S. G. Brown, " Gyro Compasses for Gun-Fire Control." Thursday.—Sir Ambrose Fleming, " Television, Present and Future."

With the object of encouraging craftsmanship in the scientific instrument trade, a section of the exhibition was devoted to the work of apprentices and learners, in competition, and the Councils of the Physical Society and Optical Society appointed as judges : Dr. C. V. Drysdale, Professor A. F. C. Pollard, Sir Thomas Stanton, and Mr. William Taylor.

" C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published ; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

137. (" *Havek* " *and* " *Vulcoferrin.*")—An inquiry has been received as to the manufacturers, properties and uses of two alloys known as " Havek " and " Vulcoferrin."

Reduction in Price of Acetone

As mentioned last week in THE CHEMICAL AGE report on the Scottish Chemical Market, the price of acetone was reduced by £5 per ton as from January 1, 1930. The reduction is a general one, world producers continuing their price agreement.

Caustic Soda in Mysore

THE question of the manufacture of caustic soda and bleaching powder by the electrolysis of brine has been under consideration by the Mysore Government for some time past. Certain concessions were at first announced by Government to induce private enterprise to start the industry. As a suitable response was not forthcoming, the Industries Board decided that the Government should pioneer the industry, and recommended that a small plant equipped with 20 cells and capable of producing 115 tons of caustic soda and 360 tons of bleaching powder should be erected by the Government. A sub-committee was then appointed to go into the question, and its report is being awaited.

From Week to Week

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS has decided to appoint a full-time secretary, preferably one who has been engaged in some branch of chemical engineering work.

PATENT APPLICATIONS IN GERMANY relative to chemical processes and apparatus numbered in 1928, 3,076, of which 602 were granted. The corresponding figures for 1927 were 3,063 and 669.

THE UNITED STEEL COMPANIES, LTD., of Sheffield, issue a very convenient flat desk calendar and engagement diary, in which the products of the constituent companies are described at the head of each weekly page.

THE AWARD OF THE M.B.E. to Mr. E. A. Bearder, M.Sc., F.I.C. (Technical Adviser, Dyestuffs Advisory Licensing Committee), and to Mr. A. A. Gomme (Librarian, Patent Office), was announced in the New Year Honours List.

SIR DOUGLAS MAWSON will read a paper on "The Occurrence of Potassium Nitrate near Goyder's Pass, McDonnell Ranges, Central Australia," before the Mineralogical Society, at a meeting to be held on Tuesday, January 14, at 5.30 p.m.

MR. A. H. HOOKER, F.I.C., will present a silver mace to the Chemical Society at the next ordinary scientific meeting, on Thursday, January 16, at 8 p.m. At the same meeting the following paper will be read: "The Variation of Phenol Coefficients in Homologous Series of Phenols," by C. E. Coulthard, J. Marshall, and F. L. Pyman.

THE I.G., already controlling about 20,000,000 crowns investment in the total share capital of Norsk Hydro, intends to increase its participation. The Norsk Hydro plans to increase its capital to 105,000,000 crowns, but the amount that the I.G. will take has not been announced. The Norsk Hydro capital increase will carry extensions proposed for a production of 90,000 metric tons of fixed nitrogen, partly by the arc process but mostly by the Haber-Bosch process, introduced there since the I.G. became interested. Norsk Hydro announced net profits of slightly over 4,000,000 crowns for the fiscal year ended June 30, 1929, against only 1,313,000 crowns earned during the previous year.

BRITISH DRUG HOUSES, LTD., have issued a revised catalogue of their products, dated January 1930, including organic and inorganic chemicals, analytical reagents, standard stains, and indicators. The company's enterprise is exemplified by the list of additions made in the catalogue, and special interest attaches to the appearance in the list of sodium diethyldithiocarbamate. As recently as last November, in a paper in the *Analyst*, Callan and Henderson suggested the use of this substance as a particularly delicate and suitable reagent for detecting and determining copper. A loose leaflet in the catalogue gives an account of the use of the reagent, amplified by work carried out in the B.D.H. laboratories.

THE H. G. SMITH MEMORIAL MEDAL of the Australian Chemical Institute has been presented to Dr. A. C. D. Rivett, deputy chairman of the Commonwealth Council for Scientific and Industrial Research. This medal has been instituted as a memorial to the late Mr. H. G. Smith, a distinguished Australian chemist, who carried out extensive investigations into the chemistry of the eucalypts. The award is made by the council of the Institute to that chemist who, in its opinion, has carried out the most meritorious research work in Australia during the preceding ten years. Dr. Rivett's work has been chiefly on physical chemistry, including a number of studies dealing with heterogeneous equilibria from the standpoint of the Phase Rule.

SHIPMENTS OF AMMONIUM SULPHATE during the first nine months of 1929 from Germany to all countries amounted to 528,933 metric tons, compared with 596,972 for the corresponding period of 1928. The outstanding features of the ammonium sulphate trade were the sharp falling off in exports to Belgium, France, Spain, Cuba, and the United States, and the marked advance in sales to Japan, China, Netherland East Indies. 24,000 tons was shipped to Russia. In the miscellaneous class covering calcium nitrate, ammonium sulphate-nitrate, and urea, a steady upward trend in sales to Denmark, Netherlands, Japan, Egypt, Italy, Austria and Finland was noted, while the shipments to the United States, Belgium and Czechoslovakia were decidedly lower.

ACCORDING TO the *Financial Times*, International Combustion, of Kingsway, London, is in no way affected by the appointment of a temporary receiver for the International Combustion Engineering Corporation, of New York. The British company and all its subsidiaries are separately financed and are independent of the American company. The capital of International Combustion is £1,200,000, consisting of 400,000 preference shares and 800,000 ordinary. Neither International Combustion nor any of its subsidiaries have any mortgages or debentures outstanding and they have had no bank overdraft at any time. The company owns the capital stock of the Underfeed Stoker Co., London, Combustion Engineering, Derby, and several other well-known companies in the power plant field, as well as the freehold works at Derby covering nearly 20 acres.

GERMAN MANUFACTURERS of black dyestuffs are reported to have agreed on a price and production quota scheme.

INDIGO EXPORTS FROM INDIA amounted in October to 23 cwt., as compared with 79 cwt. in October, 1928, and 68 cwt. in October, 1927.

THE SULPHURIC ACID PRODUCTION of Roumania, in spite of its great increase, does not yet suffice to cover domestic needs. This is due to the increased demand from the petroleum refineries.

THE SWISS CHEMICAL INDUSTRY, according to a recent report issued by the Federal Labour Office, comprises 47 firms, employing 10,882 hands. The figures were obtained by a voluntary canvass, and possibly some small additions should be made.

THE PULP MARKET, according to the Swedish Economic Review, continues to show favourable development. This is especially so with regard to unbleached sulphite, practically none of this production and only about a third of that estimated for 1930 remaining unsold.

THOMAS TYRER AND CO. state that a fire occurred at their works on the morning of Friday, January 3; although some damage was done, the fire was luckily confined to one department, and was extinguished before it had time to do much damage to other departments. The damage will not affect the company's business.

MR. R. LLOYD ROBERTS, chief labour officer to Imperial Chemical Industries, has just returned from a visit to Canada, where he discussed with the representatives of the company there whether it would be possible to introduce and transfer any labour not required at the Cheshire, Lancashire and other works into the Canadian chemical industry with a view to its development.

THE ITALIAN NITROGEN INDUSTRY is now in a position to fix 67,500 metric tons of nitrogen annually, of which 44,000 tons are produced by the synthetic ammonia process, 20,000 in the form of calcium cyanamide, and 3,500 as by-product ammonia. In addition to ammonium sulphate, the Italian nitrogen fixation industry manufactures other high-analysis fertilisers, including ammonium nitrate, ammonium sulphate-nitrate, and calcium nitrate.

DR. L. V. REDMAN, President of the Chemists' Club, New York, and one of the American visitors to England last year, has offered to equip one of the rooms at the Club to represent his Alma Mater, and is appealing to well-to-do members of the club to follow his example. "I would like" he states, "to have the room furnished in such a way that every graduate of my old college who came to New York would feel a little more at home in that room than in any other room in the city."

THE DEPARTMENT of Scientific and Industrial Research has just published "Water Pollution Research: Summary of Current Literature," Vol. III, No. 1, January 1930 (H.M. Stationery Office, pp. 36). This publication contains abstracts of current scientific and technical literature bearing on water pollution, and will appear monthly. Though labelled "Volume III," this is really the first part published, since the earlier parts, compiled primarily for the guidance of the Water Pollution Research Board, were circulated in neostyled form, and are no longer available.

LEVER BROS., LTD., have organised a subsidiary called Sociedade Anonyma Irmaos Lever, situated at Predio Gloria, Prace Ramos de Azevedo 16, Sao Paulo. The capital of the subsidiary is stated to be $480,000, of which practically the entire amount is subscribed by Lever Bros. Plans of the new organisation call for the erection of a factory in the western suburb of Lapa, and the plant is expected to be completed and placed in operation by July 1, 1930. The purposes of the factory are the manufacture and sale of soap, candles, perfumes, varnishes and other chemical products. The total cost of the establishment will be $450,000, and it will consist at first of one unit with a capacity of 50 tons of soap a week, which if necessary, can be duplicated.

BORAX CONSOLIDATED, LTD. have published a pamphlet entitled "Deliming Hides and Skins," by H. Goulding-Brown. The pamphlet is really a reprint of a series of articles which appeared in the *Leather Trades Review*, and deals with the use of boric acid in deliming pelt preparatory to tanning. In a preface, Mr. M. C. Lamb, principal of the Leathersellers' Company's Technical College, points out that boric acid, because of its mild acidic character and efficacy as a means of eliminating lime without producing acid swelling or injuring the pelt, may be justly regarded as the "Safety First" deliming agent for the tanner. The pamphlet (pp. 42) is divided into the following sections:—Introduction, Deliming, and Deliming Experiments with Microscope Observations. Copies of the pamphlet are obtainable free on application to Borax Consolidated, Ltd., 16, Eastcheap, London, E.C.3.

Obituary

PROFESSOR ALBERT ABRAHAM MICHELSON, Nobel Prizeman in Physics, in Chicago, aged 77. His work, with E. M. Morley, on the effect of the motion of ether on the velocity of light (which gave a negative result) started Einstein on the train of reasoning which led to the theory of relativity. Professor Michelson developed various optical instruments, including the interferometer, to an unprecedented pitch of precision. He received the Nobel Prize in 1907, and the Copley Medal of the Royal Society in the same year.

References to Current Literature

British

APPARATUS.—A modified Haldane apparatus. L. C. McNair. *J.S.C.I.*, December 27, p. 374T.

CELLULOSE.—The swelling of cellulose, and its affinity relations with aqueous solutions. I.—Experiments on the behaviour of cotton cellulose and regenerated cellulose in sodium hydroxide solution, and their theoretical interpretation. S. M. Neale. *Journ. Textile Inst.*, December, pp. 373–400T. The taking up of sodium hydroxide and water by sheets of regenerated cellulose; the swelling and absorption curves of cellulose in alkaline solutions; the absorption of sodium hydroxide by cotton; the heat of reaction of cellulose with sodium hydroxide solution; the effect of temperature on the swelling of cellulose in alkali; transient swelling of cellulose; and the theory of swelling and mercerisation and the gel structure of cellulose.

GENERAL.—The constants of diaphragms. A general method of determining the size and number of pores in any diaphragm of insulating material. C. E. Marshall. *J.S.C.I.*, December 27, pp. 373–374T.

Dip-volume relationships in laundry washing machines containing water or detergent solutions, together with fabric. R. G. Parker, J. N. Vowler and A. J. V. Underwood. *Journ. Textile Inst.*, December, 401–410T.

Painting as it affects the railways. F. Fancutt. *Journ. Oil and Colour Chem. Assoc.*, December, pp. 299–310.

Chemistry and certain problems of applied mycology. H. Martin. *J.S.C.I.*, January 3, pp. 11–14T.

The knock ratings of aromatic hydrocarbons. D. A. Howes and A. W. Nash. *J.S.C.I.*, January 3, p. 16T.

HELIUM.—Extraction of helium from monazite sand. R. Taylor. *J.S.C.I.*, December 27, pp. 369–372T.

United States

AMMONIA SYNTHESIS.—The historical development and theory of ammonia synthesis. A. Mittasch and W. Frankenburger. *Journ. Chem. Education*, December, pp. 2097–2103.

ANALYSIS.—Steam distillation of the lower volatile fatty acids from a saturated salt solution. W. H. Olmsted, W. M. Whitaker and C. W. Duden. *Journ. Biol. Chem.*, December, pp. 108–114. When the lower volatile fatty acids are steam-distilled from a salt solution (magnesium sulphate), characteristic rates of distillation are obtained. The quantitative collection of these acids is accelerated from 30 per cent. to 100 per cent. The identification of formic and acetic acids is facilitated.

APPARATUS.—Some simple extractors for the continuous extraction of small quantities of fluid. R. M. Hill and P. J. Fryar. *Journ. Chem. Education*, December, pp. 2231–2233.

CHEMICAL ENGINEERING.—Ethyl alcohol industry improves distillation processes. G. T. Reich. *Chem. Met. Eng.*, December, pp. 716–719.

GENERAL.—Studies in liquid partial oxidation. I.—E. P. King, S. Swann, Junr., and D. B. Keyes. *Ind. Eng. Chem.*, December, pp. 1227–1231. The catalytic oxidation of ethylbenzene and acetaldehyde in the liquid phase has been studied.

PATENTS.—When should you apply for a patent? L. Burgess. *Chem. Met. Eng.*, December, pp. 728–729.

RUBBER.—Permeability of rubber to air. I.—Effect of temperature, pressure and humidity. V. N. Morris and J. N. Street. *Ind. Eng. Chem.*, December, pp. 1215–1219.

German

ANALYSIS.—The application of ammonium oxalate in the qualitative analysis of the first three groups in the presence of phosphoric acid. M. O. Charmandarjan. *Zeitschrift analytische Chem.*, Vol. 79, Parts 3-4, pp. 90–94.

ANALYSIS, ELECTRO-.—Contributions to the new electro-analytical method of working with Wood's alloy as cathode. H. Paweck and W. Stricks. *Zeitschrift analytische Chem.*, Vol. 79, Parts 3–4, pp. 115–134.

APPARATUS.—An epidiascope for lecture experiments. A. Stock and H. Ramser. *Zeitschrift angewandte Chem.*, December 28, pp. 1165–1169.

CELLULOSE.—Sulphite-cellulose manufacture and its effluents. C. G. Schwalbe. *Chemiker-Zeitung*, January 1, pp. 4–5, January 4, pp. 21–22.

GENERAL.—Oxidation processes in motor fuels. II.—E. Berl and K. Winnacker. *Zeitschrift physikal. Chem. A.*, Vol. 145, Parts 3–4, pp. 161–176.

The reciprocal salt-pair $2NH_4NO_3 + K_2SO_4 \rightleftarrows 2KNO_3 + (NH_4)_2SO_4$ and its aqueous solutions. E. Jänecke. *Zeitschrift angewandte Chem.*, December 28, pp. 1169–1172.

Natural and synthetic camphor. F. Bornemann. *Chemiker-Zeitung*, January 1, pp. 8–9, January 4, pp. 22–23.

Artificial silk containing nitrogen. H. Stadlinger. *Chemiker-Zeitung*, January 1, pp. 5–6.

GLUE.—The determination of viscosity as a method for the evaluation of glue. E. Sauer and O. Bock. *Zeitschrift angewandte Chem.*, December 28, pp. 1176–1178.

HISTORY.—The student and travelling days of Justus von Liebig. F. Henrich. *Zeitschrift angewandte Chem.*, December 28, pp. 1173—1776. An account of some newly-discovered Liebig letters.

INDICATORS.—The azo-dyes of phenolphthalein as new, more complete indicators in acidimetry and alkalimetry. I.—H. Eichler. *Zeitschrift analytische Chem.*, Vol. 79, Parts 3–4, pp. 81–90.

MICROCHEMISTRY.—Microchemical reactions of copper, nickel and cobalt with rubeanic acid. P. Rây. *Zeitschrift analytische Chem.*, Vol. 79, Parts 3–4, pp. 94–101.

VISCOSE.—Contribution to the knowledge of viscose. II. A. Lottermoser and H. Radestock. *Zeitschrift angewandte Chem.*, December 21, pp. 1151–1154.

Miscellaneous

ANALYSIS.—The colorimetric determination of the hydrogen ion concentration of media. *Bulletin Mensuel de l'Institut de Chimie Appliquée*, No. 8 (1929), September-October, pp. 225–242 (in French).

DIALYSIS, ETC.—The phenomena of diffusion across membranes and operations dependent on it: Dialysis, ultra-filtration and osmosis. A. Boutaric. *L'Industrie Chimique*, December, pp. 664–667 (in French).

FUELS.—Substitute fuels. O. Booseré. *Bulletin Fédération Industries Chimiques Belgique*. November, pp. 471–476 (in French).

GENERAL.—Barium aluminate and its use in the purification of water. R. Stumper. *Chimie et Industrie*, December, pp. 1067–1083 (in French).

OILS AND SOAPS.—The evaporation of palm oil in an oven and its extraction in a Soxhlet. G. de Belsunce. *Bulletin Matières Grasses*, Part 10 (1929), pp. 289–290 (in French).

Two new methods for the determination of oil in olives. S. Kaloyereas, W. C. Cruess and B. E. Lesley. *Bulletin Matières Grasses*, Part 10 (1929), pp. 298–303 (in French).

Anti-oxidants for preventing the deterioration of perfumed and non-perfumed soaps. V. Boulez. *Bulletin Fédération Industries Chimiques Belgique*, November, pp. 477–480 (in French).

The conversion of calcium soaps to sodium soaps V. Boulez. *Bulletin Fédération Industries Chimiques Belgique*, December, pp. 519–522 (in French).

ORGANIC.—1 : 4—Dimethyl-3 : 5 : 6-trichloro-2-aminobenzene and some of its derivatives. E. Bures and T. Rubes. *Collection Czech. Chemical Communications*, December, pp. 648–657 (in French).

The catalytic reduction of the monohydroxybenzoic acids. F. Balas and L. Srol. *Collection Czech. Chemical Communications*, November, pp. 658–567 (in French).

PATENTS.—The patentability of chemical products. G. Lainel. *L'Industrie Chimique*, December, pp. 677–678 (in French).

WATER-GAS.—A modern water-gas installation. C. Millberg. *L'Industrie Chimique*, December, pp. 670–675 (in French).

WOOD DISTILLATION.—The process of the Société des Produits Chimiques de Clanecy for the complete treatment of pyroligneous liquid. E. Charles. *Chimie et Industrie*, December, pp. 1059–1067 (in French).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

321,394. METALLIC OXIDE MASSES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 29, 1928.

A powdered metal oxide is mixed with a heavy metal at least partly in a finely divided condition, and the metal oxidised by heating to a temperature below melting point. The oxidation may be effected in carbon dioxide or water vapour, or mixtures of these with carbon monoxide or hydrogen, or oxygen or gases containing it. Alternatively, the treatment may be effected in an inert atmosphere by using a higher oxide of a metal which is capable of oxidising the metallic part of the mixture. The final mixture of oxides is porous and compact, and suitable for filter plates, diaphragm plates, electrodes for use with an alkaline electrolyte, and contact masses. In the latter case, the product may be impregnated with salt solutions. Examples are given of the preparation of masses from iron oxide, Fe_3O_4, and metallic iron powder, and also ferrous oxide, Fe_2O_3, and iron powder. Wire gauze may be incorporated in the mixture before heating.

321,399. FATTY ACIDS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 6, 1928.

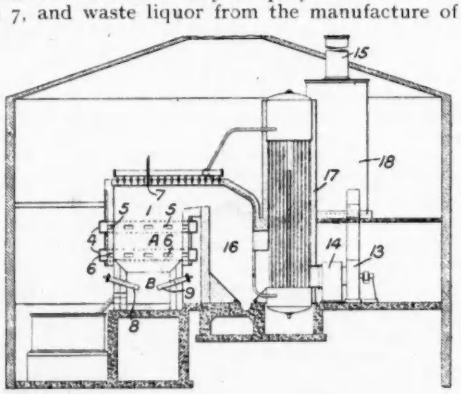
Crude fatty acids obtained by oxidising hard paraffin wax and treating as described in Specification No. 315,813 (See THE CHEMICAL AGE, Vol. XXI, p. 177) are purified by packing in press cloths at 12°—13° C. and subjecting to 100 atmospheres pressure in a hydraulic press. A dark-coloured oil is removed, leaving hard pale fatty acids.

321,401. DYES. British Celanese, Ltd., 22, Hanover Square, London, G. H. Ellis, H. C. Olpin, and E. W. Kirk of British Celanese, Spondon, near Derby. Application date, August 1, 1928.

Cellulose esters and ethers are dyed with unreduced derivatives of benzo-quinone or naphtho-quinones in which one or more nuclear hydrogen atoms are replaced by amino, alkyl-amino, or aralkyl-amino groups. The quinone residues may contain further substituents such as alkyl, nitro, and hydroxy groups, or halogen. Thus, cellulose acetate may be dyed yellow with 2:5-diamino-benzo-quinone dispersed with sodium sulpho-ricinoleate, or yellow brown with 2:5-di (methyl-amino) benzo-quinone.

321,413. RECOVERING ALKALI METAL COMPOUNDS. C. L. Wagner, 215, Cornelia Street, Boonton, N.J., U.S.A. Application date, August 7, 1928.

A furnace 1 is first heated by oil sprayed downwards through nozzles 7, and waste liquor from the manufacture of paper



321,413

pulp is then sprayed through the nozzle 7, then partly burned in a zone A by air supplied through openings 5, 6, and then completely burned in a zone B by air supplied through nozzles 8, 9 and the residual alkali salts are fused. The hot gases pass through a dust chamber 16, boiler 17, and scrubber 18, to a chimney 15. The waste from the gases may thus be used to generate steam, and water from the boiler may also circulate through pipes embedded in the top of the furnace to cool it.

321,402. CARBON BLACK. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 3, 1928.

Carbon black is obtained by decomposing carbon monoxide at a temperature of 100°—450° C. and pressure of 100—200 atmospheres in the presence of iron, nickel or cobalt, containing activating additions consisting of metal oxides such as manganous oxide, vanadium oxide, chromic oxide, uranium oxide, zinc oxide, cadmium oxide, copper oxide, or alumina, or alkalies. The carbon monoxide may be mixed with other gases such as hydrogen, carbon dioxide, nitrogen, nitrogen peroxide, water vapour, methane, ethane, naphthalene, or olefines, to regulate the temperature. The carbon black is in a highly dispersed state, and is particularly suitable for printing inks, or for use in the vulcanization of rubber, or the polymerisation products of diolefines.

321,425. NITROGEN PEROXIDE. J. Y. Johnson, London. From I.G. Farbenindustrie, Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 7, 1928.

Gases rich in nitric oxide are obtained by acidifying nitrite solutions or by reducing with sulphur dioxide the acid mother liquors from the manufacture of potassium nitrate, or by decomposing nitrosyl chloride, or by heating a solution obtained by absorbing nitric oxide in a solution of a ferrous salt. The gases are passed through a packed tower in counter-current to nitric acid of 25—58 per cent. strength at 40°—110° C. The resulting gases contain nitrogen peroxide in such proportion that liquid nitrogen peroxide is separated by cooling with water.

321,442. BORNEOL AND ISOBORNEOL. J. A. Tinling, 29, Queen Anne Street, Cavendish Square, London. Application date, August 2, 1928.

Pinene or camphene is treated with anhydrides of acyl aromatic carboxylic acids, *e.g.*, anhydride of *o*-benzoyl-benzoic acid, with or without acetic anhydride, to obtain bornyl and isobornyl esters in 75 per cent. yield. Borneol and isoborneol are obtained from these.

321,462. DYES. R. S. Barnes, J. E. G. Harris, B. Wylam, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application date, August 11, 1928.

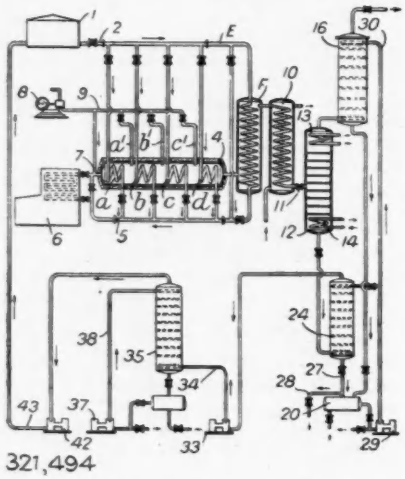
The process is for separating the ester derivatives of vat dyes from melts containing them. Thus brominated pyranthrone may be treated with pyridine sulphuric anhydride, pyridine, and copper powder, and the resulting melt heated with caustic soda solution, filtered, and the pyridine removed by steam distillation, or distillation under reduced pressure. The invention is applicable to processes such as those described in Specifications Nos. 247,787, 251,491, 258,626, 260,647, 261,139, 274,156, 277,398, 278,399 and 288,673 (See THE CHEMICAL AGE, Vols. XIV, pp. 334 and 577; XV, pp. 432, 571 and 619; XVII, pp. 198, 372 and 444; XVIII, p. 462).

321,483. DYES. British Dyestuffs Corporation, Ltd., Hex agon House, Blackley, Manchester, and R. Brightman, Crumpsall Vale, Chemical Works, Blackley, Manchester. Application date, August 21, 1928. Addition to 294,284.

Nitro-mono-azo dyes obtained as described in Specification No. 294,284 (See THE CHEMICAL AGE, Vol. XIX, p. 172) are converted into disazo dyes by reducing the nitro group, diazotizing the resulting aminoazo dyestuff and coupling with an amine or phenol of the benzene or naphthalene series, or a sulphonic or carboxylic acid thereof, at least one of the coupling components in the final disazo dyestuff being a 2:8-amino-naphthol-sulphonic acid, or an N-substituted derivative. Any free amino group in the nitro-azo dyestuff is protected by acylation, and the acyl group finally removed. In one example, the dyestuff 4-nitro-4^1-amino-diphenyl sulphide → salicylic acid is reduced with sodium sulphide, diazotized, and coupled with 8-oxy-2:2^1-dinaphthylamine-3:6-disulphonic acid. The disazo dye gives orange-brown shades on viscose silk. A number of other examples is given.

321,494. Oxidising Hydrocarbons. C. Arnold, London. From Standard Oil Development Co., 7, West 10th Street, Wilmington, Del., U.S.A. Application date, September 7, 1928.

Gaseous or low boiling hydrocarbon vapour is treated with a gas containing oxygen at a pressure of 1,500–3,500 lb. and temperature of 350°–600° C. The hydrocarbon is supplied from a tank 1 through a pipe 2 to coils *a*, *b*, *c*, *d* in a reaction chamber 4, where it is preheated. The hydrocarbon is also passed through a heat exchanger F, and all the preheated hydrocarbon is collected in a pipe 5 and passed through heaters 6 to the reaction chamber 4. A compressor 8 forces air or oxygen through pipes 9, a^1, b^1, c^1, d^1 to the reaction chamber. The reaction products are cooled in the exchanger F and cooler 10, and passed through reducer 11 to the middle of a column 12 having a cooling coil 13 at the top and a heating coil 14 at the bottom. Permanent gases escaping at the bottom are scrubbed in a tower 16 to recover liquid



321,494

products or formaldehyde, which have not been condensed in the column 12. The condensate from the column 12 passes to a liquid scrubbing column 24, where it is treated with a solvent. The solvent and oxidation products pass to a tank 20. The same solvent may be used in towers 16, 24, and is circulated by a pump 29. A pump 33 draws unoxidised hydrocarbon from the top of the tower 24, and forces it through a tower 35, through which caustic soda is circulated, to remove carbon dioxide. The purified hydrocarbon is returned by pump 42 to the tank 1. A large number of catalysts are specified, including vanadium pentoxide, copper wire coated with fused borax or sodium tunstate, silver, nickel, or iron wire, and several others. The examples include the oxidation of methane to obtain methanol, methane and ethane to obtain methanol and ethanol, propane to obtain ethanol, acetone, formic acid, methanol, propanol, and acetaldehyde, and butane to obtain propanol, propyl acetate, acetic acid, ethanol, butanol, and methanol.

321,548. Dye Intermediates. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date November 7, 1928.

1 : 4-dimethyl-2-halogen- and 1 : 4-dimethyl-2 : 5-dihalogen-benzenes are halogenated to obtain 1 : 4-hexahalogen-dimethyl-2-halogen- and 1 : 4-hexahalogen-dimethyl 2 : 5-dihalogen-benzenes. These may be saponified to obtain monohalogen-terephthalic acid, and 2 : 5-dihalogen-terephthalic acid, and the former may be nitrated to obtain 2-halogen-5-nitro-phthalic acid. Examples of these reactions are given, the halogenation being effected by exposure to intense light.

321,566. Urea and Substitution Products. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Mian, Germany. Application date, November 19, 1928.

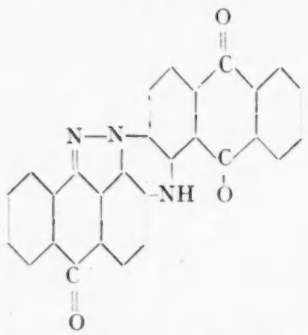
Ammonia or amines and oxides of hydrocarbon are passed over carbides of iron, nickel, cobalt, titanium, silicon, or alkaline earth metals, at 500° C. to obtain urea and substitution products. The preparation of urea from carbon dioxide and ammonia in the presence of silicon carbide is described, and also the preparation of urea from carbon monoxide and ammonia in the presence of iron carbide, and the preparation of diphenyl-urea from aniline and carbon dioxide in the presence of calcium carbide.

321,580. Salts of a Urea Derivative. G. M. Dyson, The Bungalow, Cheadle Hulme, Cheshire, and A. Renshaw, 16, St. John Street, Manchester. Application date, December 5, 1928.

To purify neutral alkali salts of the urea of *m*-aminobenzoyl-*m*-amino-*p*-toluyl-1-naphthylamine-4 : 6 : 8-trisulphonic acid, described in specification 314,909, they are converted into the lead salt, using lead acetate, the lead salt is decomposed with mineral acid, and the liberated acid neutralised with caustic alkali, alkali carbonate, or ammonia.

321,585. Dyes. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 15, 1928.

These dyes are obtained by treating pyrazolanthrones with free 2-positions with 1-amino-2-halogen-anthraquinones or their substitution products, or pyrazolanthrones which are halogenated in the 2-position with 1-amino-anthraquinones with free 2-positions in the presence of alkaline condensing agents, in an organic medium in the presence of copper or its compounds as catalysts. These vat dyes have the formula :—



The condensation products may be halogenated in nitrobenzene, sulphuric acid, oleum, or chlorsulphonic acid, yielding products clearer in shade and of greater fastness to chlorine. Examples are given of the condensation of pyrazolanthrone with 1-amino-2-bromanthraquinone or 1-amino-2-brom-4-hydroxyanthraquinone, 2-brom-pyrazolanthrone with 1-aminoanthraquinone or 1-amino-4-hydroxyanthraquinone, or 1 : 4-diaminoanthraquinone. The halogenation products of several of these dyestuffs are described.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—296,309 (I.G. Farbenindustrie Akt.-Ges.), relating to N-oxyethyl-derivatives of 2-amino-1-oxybenzene, see Vol. XIX, p. 441 ; 301,898 (I.G. Farbenindustrie Akt.-Ges.), relating to divinyl and homologues, see Vol. XX, p. 130 ; 306,447 (J. R. Geigy Akt.-Ges.), relating to conversion products of azo dyes, see Vol. XX, p. 432 ; 306,939 (Chemische Fabrik Grünau, Landshoff and Meyer Akt.-Ges.), relating to N-methyl-*p*-aminophenol, see Vol. XX, p. 454 ; 309,161 (Goodyear Tire and Rubber Co.), relating to preservation of rubber, see Vol. XX, p. 547 ; 310,949 (J. Blumenfeld), relating to separation of titanium dioxide hydrate from hydrolysable solutions of titanium salts, see Vol. XXI, p. 10.

Specifications Accepted with Date of Application

302,249. Alloys. Soc. Anon. Commentry-Four-Chambault et Decazeville. December 12, 1927.

304,245. Vat dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. January 17, 1928. Addition to 279,479.

305,654. Austenite chromium-nickel-steel alloys. F. Krupp Akt.-Ges. February 9, 1928.

305,942. Alloy. W. Muller and Olga Prinzessin zur Lippe. February 11, 1928.

306,095. Alumina and salts of aluminium from bauxites or other aluminous products, Manufacture of. U. B. Voisin. February 15, 1928.

323,012. Conversion products of rubber, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 17, 1928.

323,019. Nitro-cellulose, Manufacture of. H. F. Moulton and E. Tschudin. June 16, 1928.

523,021. Metal carbonyls, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 18, 1928.

323,026. Anthraquinone derivatives, Manufacture of. Imperial Chemical Industries, Ltd., F. Lodge, and W. W. Tatum. September 18, 1928.

323,028. Conversion products of rubber, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 17, 1928. Addition to 323,012.

323,070. Litharge and red lead, Manufacture of. R. S. Carreras. October 20, 1928.

323,076. Cast iron. British Cast Iron Research Association, A. L. Norbury, and E. Morgan. October 26, 1928.

323,080. Nitrites and nitrates, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 31, 1928.

323,100. Condensation products of polynuclear compounds, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 3, 1928.

323,113. Ammonium formate, Production of. Lady O. M. Manning. (*Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges.*) December 24, 1928.

323,115. Copper sulphate, Manufacture of. P. E. Bigourdan and P. Bebin. December 29, 1928.

323,128. Treating azo dyestuffs. C. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) January 12, 1929. Addition to 313,865.

Applications for Patents

[*In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.*]

Anderson, J., British Alizarine Co., Ltd., and Soutar, C. W. Manufacture of dyestuffs. 39,392. December 24.

Bloxam, A. G., and Society of Chemical Industry in Basle. Manufacture of anthraquinone dyestuffs. 39,487. December 24.

—— Manufacture of anthraquinone derivatives. 39,612. December 27.

Böhme Chemische Fabrik, A. T. Manufacture of sulphonic acids. 39,327. December 23. (Germany, December 24, 1928.)

Brightman, R., and Imperial Chemical Industries, Ltd. Dyeing regenerated cellulose materials. 39,600. December 27.

Cahn, F. J. Manufacture of organic acids. 151. January 2. (United States, January 4, 1929).

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of albumose-like degradation products. 39,508. December 24.

—— Manufacture of double compounds of acridine series. 39,509. December 24.

—— Manufacture of double compounds of acridine series. 39,604. December 27.

—— Manufacture of water-soluble condensation products of unsaturated fatty acids. 424. January 4.

—— Manufacture of alkyl, etc., derivatives of carbohydrates. 425. January 4.

Child, G., and Imperial Chemical Industries, Ltd., Production of sulphur. 39,386. December 24.

Clark, F. L., and Imperial Chemical Industries, Ltd. Production of titanium oxide. 39,547. December 27.

Clark, F. L., and L. M., and Imperial Chemical Industries, Ltd. Treating titanium ores. 39,548. December 27.

Coles, S. O. Cowper-. Electrodeposition of copper. 39,524. December 27.

—— Electrodeposition of metals. 39,525, 39,553. December 27.

Du Pont Ammonia Corporation. Catalytic synthesis. 39,837. December 31. (United States, December 31, 1928.)

—— Catalytic gaseous reactions. 39,838. December 31. (United States, December 31, 1928.)

Durand et Huguenin Soc. Anon. Dyeing and printing by means of vat dyestuffs. 39,314. December 23. (Germany, December 22, 1928.

Evans, W. E., and Grouchkine, L. Production of superphosphates. 39,506. December 24.

Gränacher, C. Manufacture of anthraquinone derivatives. 39,766. December 30. (Switzerland, December 28, 1928.)

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of hardened artificial masses. 39,489. December 24. (October 1, 1928.)

Guinot, H. M., and Soc. Anon. des Distilleries des Deux-Sevres. Manufacture of butyl alcohol. 39,269. December 23.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of alloys from pulverulent materials. 39,284. December 23.

—— Purification of gases. 39,459. December 24.

—— Production of methylamine. 39,640. December 24.

—— Production of compact metals, etc. 39,461. December 24.

—— Production of washable tapestries, etc. 39,642. December 24.

—— Production of catalysts containing free acid of phosphorus. 39,463. December 24.

—— Conversion of compounds into finely divided form. 39,759. December 30.

—— Conversion of metalloids into a finely divided form. 39,874. December 31.

—— Conversion of hydrocarbons into those of lower boiling point. 169. January 2.

—— Manufacture of anthanthrone derivatives. 175. January 2. (October 9, 1928.)

I.G. Farbenindustrie Akt.-Ges. Production of matte effects on cellulose ethers, etc. 39,355. December 23.

—— Manufacture of indigoid dyestuffs. 39,356. December 23. (Germany, December 22, 1928.)

—— Electrically-conducting coils, etc. 39,486. December 24. (Germany, December 28, 1928.)

—— Moistening air in rooms. 39,488. December 24. (Germany, December 29, 1928.)

—— Manufacture of artificial materials from cellulose. 39,767. December 30. (Germany, December 29, 1928.)

—— Manufacture of titanium tanning preparations. 85. January 1. (Germany, January 2, 1929.)

—— Electrical insulating-materials. 191. January 2. (Germany, February 13, 1929.)

—— Photographic film-pack casing. 192. January 2. (Germany, January 10, 1929.)

—— Manufacture of basic products. 193. January 2. (Germany, January 2, 1929.)

—— Manufacture of dyestuffs of the diphenylnaphthyl methane series. 309. January 3. (Germany, January 4, 1929.)

Imperial Chemical Industries, Ltd. Cracking hydrocarbons. 39,417. December 24.

—— Production of hydrocyanic acid. 39,418. December 24.

—— Emulsions of resins and application thereof. 39,596. December 27.

—— Impregnating and coating compositions. 39,599. December 27.

—— Hydrogenating bituminous coal. 39,662. December 28.

—— Hydrogenating carbonaceous materials. 39,663. December 28.

—— Change-speed gear mechanism. 39,729. December 30.

Imperial Chemical Industries, Ltd. and Ross, A. Treating phosphate rock. 375. January 4.

Kaufmann, H. P. Production of saturated fatty acids. 39,438. December 24. (Germany, December 27, 1928.)

Kunstharzfabrik, Dr. F. Pollak Ges. Manufacture of condensation products. 82. January 1. (Austria, November 27, 1929.)

Mills, H. A. T. Production of hydrocyanic acid. 39,418. December 24.

Monsanto Chemical Works. Aromatic sulphamide formaldehyde composition. 39,885. December 31. (United States, December 31, 1928.)

Montecatini Soc. Generale per l'Industria Mineraria ed Agricola. Manufacture of nitric acid. 39,326. December 23. (Italy, February 27.)

Schering-Kahlbaum Akt.-Ges. Manufacture of mono brominated menthane. 39,456. December 24. (Germany, December 31, 1928.)

—— Manufacture of thymol, etc. 39,457. December 24. (Germany, December 31, 1928.)

Soc. des Brevets Etrangers Lefranc et Cie. Preparation of aliphatic anhydrides, etc. 39,611. December 27. (France, January 8.)

Soc. d'Etudes Chimiques pour l'Industrie. Production of cyanamides of alkaline earth metals. 39,413. December 24. (Germany, December 24, 1928.)

Soc. Etudes et Réalisation dite Ereal. Installation for carrying out endothermic reactions. 39,483. December 24. (Belgium, December 27, 1928.)

Soc. d'Etudes Scientifiques et d'Entreprises Industrielles. Producing hydrogen and ammonium phosphates. 39,734. December 30. (Germany, January 22.)

Soc. of Chemical Industry in Basle. Manufacture of anthraquinone derivatives. 39,315. December 23. (Switzerland, December 22, 1928.)

New German Fertiliser

THE KALI-CHEMIE A.-G., a merger of the former Neustassfurt-Friedrichshall potash company and the Rhenania-Kunheim company, proposes to enter the market immediately with its new fertiliser mixture, Kali-Rhenania phosphate. It will be a combination of potash with phosphoric acid, which is obtained by treatment of phosphate rock with soda ash. It is probable that this company will withdraw from the Superphosphate G.m.b.H., the superphosphate cartel, and sell independently.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0¾d. per lb.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 6os. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

AMMONIUM BICHROMATE.—8¼d. per lb.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

CHROMIUM OXIDE.—10d. and 10½d. per lb. according to quantity.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS.—4¾d. per lb. nett d/d U.K. spot; ground ¼d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8¼d. per ld.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton carr. paid.

SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—3¾d. per lb. nett d/d U.K. spot. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2½d. per lb.

SODIUM CHROMATE.—3½d. per. lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 8½d. per lb. Crude 60's, 2s. 4d. to 2s. 6d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 7d. per gall. Pure, 5s. to 5s. 2d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. 2d. to 2s. 3d. Dark, 1s. 6d. to 2s. Refined, 2s. 7d. to 2s. 10d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit.. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 5d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6¼d to 6⅝d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2½d per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 47s. 6d. per ton, f o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. *per lb*, *in* ton lots d/d.

p-CRESOL 32/34° C.—2s. per lb, in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C, 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

VERMILION.—Pale or deep, 6s. 9d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; extra fine powder, £38 per ton. Packed in 2-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 10½d. to 1s. 11d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 4d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE —5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—8s. 9d. per lb.

BISMUTH CITRATE.—8s. 3d. per lb.

BISMUTH SALICYLATE.—8s. 3d. per lb.

BISMUTH SUBNITRATE.—7s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.

BISMUTH OXIDE.—11s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 3d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.

BORAX B.P.—Crystal, £21 per ton; powder, £22 per ton; powder, ex. fine, £23 per ton. Packed in 1-or 2-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8¼d. per lb.; granular, 1s. 7¾d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 3d per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 9d. per lb. Green, 2s. 10d. to 3s. per lb. U.S.P., 2s. 7d. to 2s. 10d. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 18s. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals 9s. 6d. to 12s. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 2½d. to 3s. 9d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—104s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 6d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—2s. 2d. per lb., B.P.C. 1923, and U.S.P. ix—2s. 6d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 3d. per lb.

CITRONELLOL.—10s. 6d. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—10s. 6d. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELIOTROPINE.—7s. per lb.

ISO EUGENOL.—12s. per lb.

LINALOL.—Ex Bois de Rose, 12s. per lb. Ex Shui Oil, 10s. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 12s. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—48s. per lb.

SAFROL.—2s. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiacol, 13s. to 14s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. per lb.

BERGAMOT OIL.—12s. per lb.

BOURBON GERANIUM OIL.—18s. 3d. per lb.

CAMPHOR OIL, WHITE.—160s. per lb.

CASSIA OIL, 80/85%.—5s. per lb.

CINNAMON OIL LEAF.—7s. 9d. per oz.

CLOVE OIL (90/92%).—8s. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 12s. 9d. per lb.

LEMON OIL.—8s. 6d. per lb.

LEMONGRASS OIL.—4s. per lb.

PALMA ROSA.—11s. 6d. per lb.

PEPPERMINT OIL.—English, 70s. per lb.; Wayne County, 15s. per lb.; Japanese, 5s. 6d. per lb.

PETITGRAIN.—8s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, January 9, 1930.

SINCE the resumption of business there has been a fair and regular demand for the majority of chemical products, but markets are still suffering to a small extent from the effects of the holiday and stock-taking period. One or two adjustments in prices have been made since our last report. Export trade is steady.

General Chemicals

ACETONE.—Prices have been reduced to £71 10s.—£80 per ton, according to quantity, and this reduction is stimulating the demand, there being rather more business offering.

ACID ACETIC.—Is unchanged, with a fair demand at £36 10s. for 80% technical and £1 per ton extra for 80% edible.

ACID CITRIC.—Demand is only for small quantities, and price is steady at about 2s. 1d. per lb., less 5%.

ACID LACTIC.—Quite good business is being conducted, with the price steady at £43 per ton for 50% by weight, pale quality.

ACID OXALIC.—Rather more business is being placed, with prices firm at £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC.—Trade is still rather slow, with prices unchanged at about 1s. 4d. to 1s. 4½d. per lb., less 5%.

ALUMINA SULPHATE.—Quite an active trade is passing, with prices firm at £8 to £8 5s. per ton for 17/18% iron-free quality.

ARSENIC.—Little improvement can be reported in the demand, and price is unchanged at about £16 7s. 6d. to £16 17s. 6d. free on rails mines according to quantity.

BORAX.—More trade is passing, with the market now steady at the new rates.

CREAM OF TARTAR.—A little more business is on the market, with the market unchanged at about £104 per ton for 99/100% B.P. quality.

COPPER SULPHATE.—Demand is increasing, with the market firm at £28, less 5%.

FORMALDEHYDE is in quite good demand, and prices remain steady at £36 per ton.

LEAD ACETATE.—Demand has been fair, with price for white at £44 per ton and brown £43 per ton unchanged.

LEAD NITRATE.—Steady at £33 15s. per ton.

LIME ACETATE.—A little more inquiry is being received, and price is unchanged.

LITHOPONE.—There is no change to be reported, the market continuing steady at £19 15s. to £23 per ton, according to quantity.

POTASSIUM CARBONATE.—Firm at £27 for 96/98% best technical arsenic—free quality.

POTASSIUM CAUSTIC.—There has been an adjustment in the price since our last report, and the market is now steady.

POTASSIUM CHLORATE.—There is a brisk demand, with the market firm at about £30 per ton.

POTASSIUM PERMANGANATE.—The market continues active at 5½d. per lb. for B.P. needle crystals.

SODIUM ACETATE.—Demand has not been quite so brisk, and prices are quoted at about £21 10s. to £22 per ton.

SODIUM BICHROMATE.—Steady conditions continue at 3⅜d. per lb.

SODIUM HYPOSULPHITE.—Prices are unchanged, the commercial being in steady demand at £8 10s. to £9 per ton, with photographic crystals steady at £14 10s. to £15 per ton.

SODIUM NITRITE.—In good request at £20 per ton.

SODIUM PRUSSIATE.—Firm at 4¾d. to 5¼d. per lb.

SODIUM SULPHIDE.—Quite substantial business has been placed at the higher rates, with the market firm.

TARTAR EMETIC.—Unaltered at 11d. per lb., and in good request.

ZINC SULPHATE.—Firm at £13 10s., with a good demand.

Coal Tar Products

The market for coal tar products shows little change from last week, although prices for cresylic acid are strengthening.

MOTOR BENZOL is unchanged at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r.

SOLVENT NAPHTHA remains at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA is quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL is unchanged at 3d. to 3¼d. per gallon f.o.r. in the North, and at 4d. to 4¼d. per gallon in London.

NAPHTHALENES.—The firelighter quality remains at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH shows no change at a nominal figure of 47s. 6d. per ton f.o.b. East Coast port, with few buyers.

Nitrogen Products

Sulphate of Ammonia: Export.—There is a moderately good demand from overseas, but the market as a whole continues quiet, the price being about £8 7s. 6d., f.o.b. U.K. ports, in single bags, neutral quality. *Home.*—There is little of interest to report, and the demand is not likely to improve during the present weather conditions.

Nitrate of Soda.—The position in regard to this product remains unchanged.

South Wales By-Products

SOUTH WALES by-product activities continue to be on the quiet side, the demand for most products being sporadic and unsatisfactory. Pitch has a moderate call, with quotations unchanged, 48s. to 50s. per ton delivered. Road tar is slightly better, but not satisfactory, with prices ranging from 11s. to 13s. per 40-gallon barrel. Heavy naphtha has a weak call at round about 11d. to 1s. 1d. per gallon, while solvent naphtha is very little better, with values ranging from 1s. 2½d. to 1s. 4½d. per gallon. Refined tars remain a fairly bright feature, with quotations for coke oven and gasworks tar unchanged. Motor benzol retains its increased activity, but quotations are unchanged at 1s. 3½d. to 1s. 5½d. per gallon. Creosote has scarcely any call, and has a tendency to weaken. Patent fuel and coke exports are fairly good, but cannot be termed satisfactory. Patent fuel, ex-ship Cardiff, is quoted at 22s. to 22s. 6d. per ton; ex-ship Swansea and Newport, a shilling less. Coke prices are unchanged.

Scottish Coal Tar Products

THERE is no material alteration to report this week. Prices are well maintained, but there is still a lack of orders. Tar acids are gradually easing in value, but there is no reason to suppose that it is more than a passing phase.

Cresylic Acid.—Values are easier with little business passing. Pale 99/100% is 1s. 10½d. to 2s. 0½d. per gallon, Pale, 97/99%, 1s. 9d. to 1s. 10d. per gallon. Dark, 97/99%, 1s. 7½d. to 1s. 8½d. per gallon, high boiling, 1s. 10½d. to 2s. 0½d. per gallon; all at works in buyers' packages.

Carbolic Sixties.—The production in Scotland continues to be small. Value is easy at 2s. 4d. to 2s. 5d. per gallon.

Creosote Oil.—Export orders are still required before any alteration can be expected. To-day's quotations are probably as low as they are likely to be. Specification oil is 4d. to 4¼d., gasworks ordinary 3d. to 3¼d., washed oil 3⅛d. to 3⅜d.; all per gallon free on rails works.

Coal Tar Pitch.—Value is well maintained in this locality. Coke oven and horizontal is 52s. 6d. to 55s. per ton, and vertical 50s. to 52s. 6d. per ton, both at works for home trade. Export value is nominal at about 5s. per ton lower.

Blast Furnace Pitch is unaltered at 30s. per ton rails works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—This article is giving complete satisfaction to tar distillers. Value is firm at about 3⅞d. to 4⅛d. per gallon, ex works in buyers' barrels.

Blast Furnace Tar.—There is no alteration, controlled price remaining at 2¾d. per gallon at works.

Crude Naphtha is unchanged at about 4¾d. to 5¾d. per gallon, according to district.

Water White Products are in slightly better demand. 90/160 solvent is firmer at 1s. 1½d. to 1s. 2½d. per gallon, but 90/190 heavy solvent remains at 1s. to 1s. 0½d. per gallon. Benzol is 1s. 5d. to 1s. 5½d. per gallon.

Latest Oil Prices

LONDON, January 8.—LINSEED OIL closed firm and about 5s. per ton higher. Spot, ex mill, £44 15s.; January, £41 2s. 6d.; February–April, £39 12s. 6d.; May–August, £38 10s., naked. RAPE OIL was dull. Crude extracted, £41; technical refined, £42 10s., naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £29; refined common edible, £34; deodorised, £36, naked, ex mill. TURPENTINE was slow and unchanged. American, spot, 43s. 9d.; February–April, 44s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot, £43; January, £43; January–April, £42; May–August, £39 10s. per ton, naked. COTTON OIL.—Egyptian crude spot, £29; January, £28 10s.; edible refined spot, £32 5s.; technical spot, £31 15s.; deodorised spot, £34 5s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent. spot, £31 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted spot, £35; deodorised spot, £39 per ton. SOYA OIL.—Extracted and crushed spot, £30 10s.; deodorised spot, £34 per ton. RAPE OIL.—Crushed-extracted spot, £40 10s.; refined spot, £42 10s. per ton. TURPENTINE.—Spot, 46s. 3d. per cwt. COD OIL, 31s. per cwt. CASTOR OIL unchanged.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, January 8, 1930.

THERE has been quite a fair amount of business going since the resumption after the holidays, both for spot delivery and for contracts. Prices generally remain firm, but caustic potash is lower; otherwise there are no changes to report.

Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Prompt delivery difficult to obtain and prices quoted for early delivery round about 9½d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material quoted £37 per ton, ex wharf. On offer for prompt shipment from China at £34 per ton, c.i.f. U.K. ports.

ARSENIC. WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4 ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex works.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and £14 12s. 6d. per ton for 70/75% in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅞d. per lb., delivered buyers' premises with concession for contracts.

SODIUM CARBONATE. (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 13s. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 per ton. Broken, 60/62%, £10 per ton. Crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small parcels.

Ingenious French Fertiliser Propaganda

A Special Train

A SPECIAL train equipped for fertiliser propaganda recently travelled through the agricultural regions in France coming within the purview of the State railway system. The idea initiated by the State railways is to have similar trains circulating twice a year throughout the principal agricultural areas. The train consisted of six exhibition cars each devoted to a different aspect of the situation, as follows:

Car I: Improvement obtained by the use of calcareous fertilisers on compact soils.

Car II: Results from sulphate of ammonia.

Car III: Salts of potash and their application.

Car IV: Selection of grains and their relation to fertilisers used.

Car V: Results and documentation.

Car VI: Isothermic, illustrating the advantages of cold storage for the transport of perishable agricultural products.

The train visited not only the smaller agricultural communities, but the larger cities as well, and gave out a wealth of printed material on fertilisers.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, January 9, 1930.

Conditions on the Manchester chemical market during the past week have shown a pretty general return to those prevailing before the holiday break, although in some respects seasonal quietness is still in evidence. With the important exception of textile chemicals, the immediate outlook for which is not too promising, there is some hope of a reasonable aggregate business being done during the present quarter, the volume of inquiry still being on a fair scale.

Heavy Chemicals

Dibasic phosphate of soda is steady at about £11 per ton, although the demand this week has been very moderate. A steady trade is passing in the case of caustic soda, contract offers of which for delivery to home users range from £12 15s. to £14 per ton, according to quality. Sulphide of sodium meets with a quiet demand at from £10 to £14 per ton for the 60-65 per cent. concentrated solid quality and from £8 2s. 6d. to £9 2s. 6d. for crystals, according to quantity in each case. Prussiate of soda is very firm and a fair business is going through at from 4¾d. to 5¼d. per lb. There is a steady inquiry about both for bicarbonate of soda and alkali and quotations for these materials are very firm on the basis of £10 10s. per ton and round £6, respectively. Bichromate of soda is a fairly active section of the market and contract prices for delivery over the first six months of the year are on the basis of 3⅝d. per lb., less discounts of varying extent according to quantity. Chlorate of soda is reasonably steady at the moment in the neighbourhood of 2½d. per lb., although only a relatively quiet business has been reported here during the past week. With regard to hyposulphite of soda, buying interest is of moderate extent and quotations are fully maintained, the photographic grade being on offer at round £15 per ton and the commercial material at from £9 to £9 5s.

Bichromate of potash is attracting a fair amount of attention and prices are steady at 4⅜d. per lb., in contracts. With regard to yellow prussiate of potash a fair buying movement is reported at firm prices, these ranging from about 6¾d. to 7¼d. per lb., according to quantity. Carbonate of potash meets with a moderate demand and values show little change on the week at round £26 5s. per ton. Caustic potash has been on the quiet side, with current quotations at from about £30 to £30 10s. per ton, according to grade. Permanganate of potash keeps up, the commercial material selling at round 5¼d. per lb. and the B.P. at 5½d. The movement of chlorate of potash is not particularly active at the moment, but at from 2¾d. to 3d. per lb. prices are maintained.

Sulphate of copper meets with a quiet demand on this market, although values are steady at from £26 15s. to £27 per ton, f.o.b. Interest in the case of arsenic is only on moderate lines, but there has been no further easing of prices, round £16 per ton at the mines being quoted this week for white powdered, Cornish makes. Nitrate of lead is quiet and easy in tendency at £33 to £33 5s. per ton, with white acetate quoted at about £39 10s. per ton and the brown quality at £39. A moderate business is passing in the acetates of lime, with the grey on offer at £16 per ton and the brown at about £7 12s. 6d.

Acids and Tar Products

A fairly active demand is being experienced for acetic acid and prices are firm at about £36 10s. per ton for the 80 per cent. commercial grade and £66 for the glacial. Oxalic acid is steady at round £1 13s. per cwt., ex store, with enquiry this week on moderate lines. Citric acid is in quiet request and at 1s. 11¾d. per lb. values are easy in tendency. With regard to tartaric acid, conditions in this section are very similar with quotations at from 1s. 4d. to 1s. 4¼d. per lb.

Pitch is steady and in moderate demand at round 47s. 6d. per ton, f.o.b. Creosote oil is offered at up to about 4¼d. per gallon, naked, with both home and export business restricted. Solvent naphtha is in fair request at about 1s. 2½d. per gallon. Firmness continues in respect of carbolic acid, crude 60's being quoted at from 2s. 6d. to 2s. 7d. per gallon and crystals at round 9¼d. per lb.

Company News

Canadian Industries (formerly Canadian Explosives).—A dividend of 1¾ per cent. for the quarter ended December 31, 1929, is announced on the 7 per cent. cumulative preferred shares, payable on January 15.

Eastman Kodak Co. of New Jersey.—It is announced by Kodak, Ltd., that "owing to the amount of work involved in connection with the recent new issue of shares and the enormous number of transactions which have taken place, it has been found impossible to dispatch the dividend warrants on the due date. It is hoped to post them on or about January 16."

Mineral Oils Extraction, Ltd.—The company announce that the £10 shares have been subdivided into £1 shares and the capital increased from £35,000 to £100,000 by the creation of 65,000 new shares of £1 each. The additional shares will be issued privately, and the capital used for the extension of existing plant and operations in Tasmania and for further commercial developments of the Crozier process for the low-temperature distillation of coal and oil-shale.

Canada Cement Co.—The report for the year ended November 30, 1929, states that the company has shared in continued activity in the building trades, and sales of cement have been larger in practically all districts. This has enabled plants to operate more continuously and has resulted in some operating economies. The profit from operations, after making provision of $2,038,717 for depreciation of capital assets, was $3,171,115. Bond interest absorbed $1,100,000; to fire insurance reserve has been placed $154,520; to reserve for extraordinary repairs and renewals, $25,000; to reserve for industrial accidents, $24,500, to contingent reserve (for Government income taxes, etc.), $250,000; and to preference stock sinking fund, $16,394, leaving $1,600,701. The dividend on preference stock takes $1,364,870, leaving a balance of profits of $29,873

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

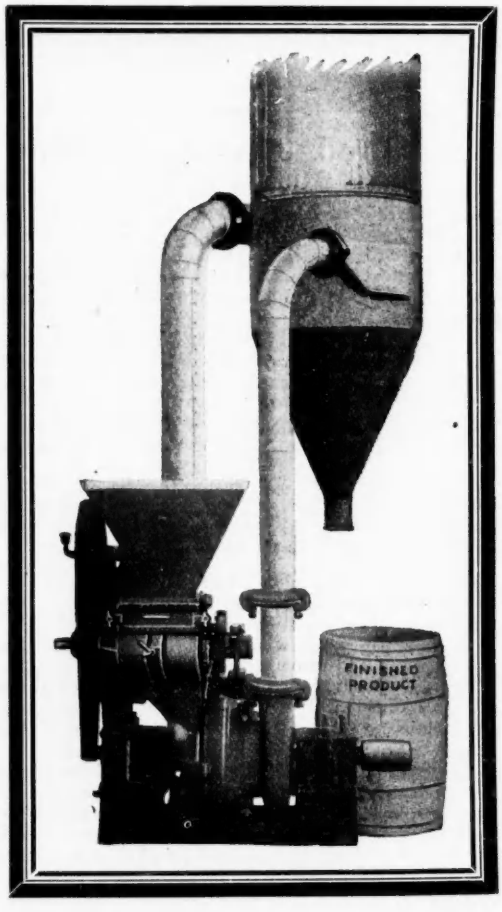
Laboratory Glassware.—The Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for test tubes, measures, etc. Tenders are due January 21. Forms of tender are available from the above at a non-returnable fee of 5s.

Chemicals and Gases.—These products, among numerous others, are required by the Army. Manufacturers who are not already on the War Office list of tenderers, and who may wish to be invited to tender for Army requirements of the above stores, should apply to the Director of Army Contracts at the address given below for Form 1, on which formal application for inclusion on the list of tenderers may be made.—The Director of Army Contracts, Caxton House (West), Tothill Street, Westminster, London, S.W.1.

New Chemical Buildings at Leeds University

Another large section of the scheme of new buildings for the University of Leeds will shortly be commenced, plans having now been approved for the new building to accommodate the Department of Chemistry, inorganic, organic and physical. This chemistry building, stretching from the Physics Department to Woodhouse Lane will, together with the Mining block at right-angles to it, form the north elevation of the new scheme. The east elevation will run alongside Woodhouse Lane for a distance of about 180 feet, and at its lower end another wing, containing a number of large laboratories, will reach back a distance of 240 feet towards the Physics building, forming the southern side of the rectangle of which the complete building will consist. The erection of certain parts of the chemistry block is being postponed, but even with this omission the building shortly to be started will have a floor space of some 95,000 square feet

Not an Atom of Dust



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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

WHITE SEAL SOAP CO., LTD., Josephine Works, Carpenter Road, Stratford, soap manufacturers. (C.C., 11/1/30.) £76 8s. 11d. November 15.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

GAMBLES (J. C.) AND CO., LTD. (late QUELCH AND GAMBLES, LTD.), London, S.E., druggists. (M., 11/1/30.) Registered December 31, mortgage for £21,000 and further advances, to Leeds Permanent Building Society; charged on 211 to 215, Blackfriars Road, S.E. *Nil. May 1, 1929.

NEW PACCHA AND JAZPAMPA NITRATE CO., LTD., London, E.C. (M., 11/1/30.) Registered December 21, letter of hypothecation to Bank; charged on present and future stocks of nitrate, iodine, bags and other stocks. *——. July 29, 1929.

Satisfaction

PEARS (A. AND F.), LTD., Isleworth, soap manufacturers. (M.S., 11/1/30.) Satisfaction registered December 31, £5,000, part of amount outstanding July 1, 1908.

Receivership

A. J. BOLT, JR. (PORTSMOUTH), LTD. (R., 11/1/30.) H. V. Young, Accountant, of Cambridge Junction, Portsmouth, was appointed receiver on December 27, 1929, under powers contained in first mortgage debentures dated July 30, 1928.

London Gazette, &c.

Companies Winding Up Voluntarily

BARYTES CONSOLIDATED, LTD. (C.W.U.V., 11/1/30.) December 31. By reason of its liabilities. H. Hagon, 82, Victoria Street, Westminster, S.W.1, nominated as liquidator.

NITRAM, LTD. (C.W.U.V., 11/1/30.) By Special Resolution December 31. R. A. Lynex, Imperial Chemical House, Millbank, London, S.W.1, appointed as liquidator.

Bankruptcy Information

DOWNHAM, Leeming, trading as the CRESCENT CHEMICAL CO., lately Waterfold Mills, Heap Bridge, Bury, Lancashire, advisory chemist. (R.O., 11/1/30.) Receiving order, December 31. Creditor's petition.

Partnerships Dissolved

WALTER WAUGH AND CO. (Walter Charles WAUGH, George Edward VAN DER OSTEN, Frank Albert WAUGH and Walter WAUGH (deceased),) chemical merchants, 4, Lloyds Avenue, London. By mutual consent as from December 31, 1929.

New Companies Registered

HOPE HARTOPE AND CO., LTD., 43, Gower Street, London, W.C. Registered January 4. Nominal capital, £10,000 in £1 shares. To acquire the business of oil manufacturers and refiners and manufacturers of and dealers in chemicals carried on by R. J. H. Hope, R. H. King and A. Elmer, at 43, Gower Street, W.C., London, as "Hope Hartope and Co." Directors: R. J. H. Hope, R. H. King.

ROY WILSON, DICKSON, LTD. Registered January 3. Nominal capital, £25,000 in £1 shares. Manufacturers and merchants of tanning materials and extracts, dyes, colours, chemical substances, also pulp and materials used in the manufacture or treatment of papers of all kinds. Directors: R. Wilson, Woodbank Hall, near Chester, C. Dickson.

STANDARD MANUFACTURING CO. (RADCLIFFE), LTD., Pioneer Mills, Radcliffe, Lancs. Registered January 1. Nominal capital, £12,000 in £1 shares. To adopt an agreement with the Radcliffe Loom and Power Co., Ltd., and to carry on business as cotton spinners and manufacturers, dyers, bleachers, finishers, manufacturers of and dealers in dyestuffs, drugs, chemicals, liquids and extracts, etc. Directors: A.Ogden, S. Taylor, and E. Emery.

Helium Production at Amarillo

Steady Reduction in Costs

THE United States Government helium plant at Amarillo Texas, has again made new records in cost of production and purity of the product. During September, the plant produced 847,840 cubic feet of helium of 97·7 per cent. purity. Engineers of the Bureau of Mines refer to the helium content as the "contained helium."

The operating costs for the month were $14,609.31, or $17.63 per thousand cubic feet of contained helium produced. These operating costs represent the current expenditures made from the United States Treasury to operate and maintain the plant and gas field, and to cover supervisory expenses in Washington. There is a return to the Treasury from the month's operation of $3,000.79 from the sale of residue natural gas from the plant. Deducting this return from the gross expenditures of $14,609.31 gives a net expenditure by the Government of $11,608.52, or only $14.01 per thousand cubic feet of contained helium produced.

Operating Costs

The September report confirms the statements made by the Bureau of Mines before the Amarillo plant was built, to the effect that its operating costs would be much lower than those which prevailed at the Government's Fort Worth helium plant. The Fort Worth plant formerly supplied helium used by the Army and Navy, but was closed in January, 1929, because of exhaustion of the gas field on which it depended for its helium-bearing natural gas. During the six months ending in December, 1925, when the Fort Worth plant was producing at the rate of 830,000 cubic feet of helium per month, or approximately the same rate as the production from the Amarillo plant in September, 1929, the average operating costs were about $28,800 per month, or $34.70 per thousand cubic feet of contained helium produced.

During the last six months of the operation of the Fort Worth plant, when the average production was only 407,000 cubic feet per month, because of the approaching exhaustion of the plant's supply of raw material, the average monthly operating costs were reduced to about $19,600, but the cost per unit of product rose to about $48.00 per thousand cubic feet of contained helium. At the Fort Worth plant the residue gas did not belong to the Government; therefore no return from it was received.

Greater Purity in Sight

Although the average purity of 97·7 per cent. shown by the September report is lower than purities that will be attained after the Amarillo plant is more completely adjusted, it is a marked improvement over the purity of the helium that was produced at Fort Worth. The average purity of the Fort Worth product was 94·6 per cent. in 1926, 95 per cent. in 1927, and 95·4 per cent. in 1928. The highest monthly average purity recorded at the Fort Worth plant was 96·6 per cent. in December, 1928.

The construction of the Amarillo helium plant was started about August 1, 1928. Operation of the machinery for testing and adjustments was commenced in January, 1929, and production of helium was started in April. Since April the rate of production, purity of product and operating efficiency have increased steadily. Further improvements in purity and efficiency, and a further lowering of operating costs, are expected in the future.